CIVIL DEFENSE

Part I—Shelter Policy
Part II—Post-Attack Planning
Part III—Relation to Missile Programs

HEARINGS

BEFORE A

SUBCOMMITTEE OF THE COMMITTEE ON GOVERNMENT OPERATIONS HOUSE OF REPRESENTATIVES

EIGHTY-SIXTH CONGRESS

SECOND SESSION

PART I—MARCH 28, 1960
PART II—MARCH 29, 1960
PART III—MARCH 30 AND 31, 1960

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CIVIL DEFENSE

Part I—Shelter Policy

MONDAY, MARCH 28, 1960

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON MILITARY OPERATIONS
OF THE COMMITTEE ON GOVERNMENT OPERATIONS,
Washington, D.C.

The subcommittee met, pursuant to call, at 10 a.m. in room 1310, New House Office Building, Hon. Chet Holifield (chairman of the subcommittee) presiding.

Present: Representatives Holifield, Kilgore, and Riehlman.

Also present: Herbert Roback, staff administrator; Carey Brewer, special consultant; Douglas Dahlin, staff attorney; Paul Ridgely, investigator; and Robert McElroy, investigator.

Mr. HOLIFIELD. The public hearings to be held this week by the Military Operations Subcommittee will be concerned with national shelter policies and other aspects of civil defense. We will review the status of:

(1) Shelter construction under the so-called national shelter policy;

(2) Planning for post-attack recovery operations; and

(3) Civil defense implications of missile base location and "hardening" programs.

For the first two subjects, we will hear Governor Leo Hoegh, Director of the Office of Civil and Defense Mobilization, and other persons designated by him. The hearing today will cover shelter policies; the hearing tomorrow will review postattack recovery planning, and in this connection the work of the Federal agencies which have delegated assignments from OCDM will be summarized.

On Wednesday, Air Force representatives will present their concepts and criteria for selecting and protecting missile bases. We are concerned here with the civil defense implications, for it is obvious that the location of missile launching sites adjacent to heavily populated areas makes the fallout hazard and shelter problem especially acute.

Base "hardening" adds greatly to the dimensions of the problem. The harder the targets, the more bombs and missiles an enemy would have to expend to knock them out. This multiplies the already frightening fallout hazard so that potentially a great part of the country is endangered.

There are, of course, other means of reducing vulnerability. We have requested the Navy to present testimony Thursday on the mobile weapon concept embodied in the Polaris ballistic missile. On Fri-

day, Dr. Ralph Lapp will tell us about his recent analysis of potential fallout hazards related to missile sites.

The national shelter policy, which will be discussed in the testimony by OCDM representatives, was first announced before this subcommittee during the hearings of May 7, 1958 (see "Civil Defense," hearings before a subcommittee of the Committee on Government Operations, House of Representatives, 85th Cong., 2d sess., pp. 394, and following). We made a critical appraisal of the national shelter policy in a report presented after the hearings in May 1958 (see H. Rept. 2554, Atomic Shelter Programs, 85th Cong., 2d sess., pp. 11–12).

Two years have passed since the national shelter policy was announced before our subcommittee. Today we expect to hear what has been accomplished. Frankly, we don't expect much, because this shelter policy was a policy of "education," not a policy of "construction."

RESPONSE TO SUBCOMMITTEE QUESTIONNAIRE

There have been, I understand, some prototype or demonstration shelters constructed here or there with OCDM encouragement and financial assistance; and a few homeowners have improvised or constructed fallout shelters in their basements. But the information which comes to us from the State governors and mayors of leading cities is that very little has been accomplished.

The chart which you see in the room attempts to summarize, for the States which have responded to date, the answers to the following questions:

1. How many civil defense home shelters have been constructed in your State?
2. How many public buildings in your State have been modified to provide shielding from fallout?
3. Does your State civil defense agency have an underground control center?
4. How many underground structures having a dual civil defense purpose, such as parking garages, have been constructed in your State?
5. Has fallout protection, in the form of structural modifications, been incorporated in any of your public schools? If so, in how many?

To date, we have heard from 35 States and 66 cities. The 35 States report something like 1,565 home fallout shelters. This figure, for the most part, is based on the roughest kind of estimates and guesses, and the definition of "fallout shelters" varies. In the 66 reporting cities, the number of home fallout shelters adds up to 356. This is part of the total included in the State figures.

The States report a total of 14 public buildings modified structurally to provide for shelters. The cities report nine buildings modified, plus two planned.

Five underground State civil defense control centers and nine underground local civil defense control centers were reported.

The States report eight underground dual-purpose structures—that is, structures which could serve as shelters while having commercial or civic use. The cities report seven dual-purpose structures plus the unused subway tunnel in Los Angeles which has not been modified.

The States report that four public schools have been modified for fallout protection, plus one planned. The cities report one school modified, with one more planned.

I have a notation that since the compilation of the report we have received a reply from the Governor of Illinois to the civil defense questionnaire, and this reply will be made part of the record. The reply is out of line with the rest of the replies of the several States in that it makes claims for what seems to us to be an excessive amount of underground shelters, and also the words are ambiguous. In answer to question No. 5 with respect to school modification, it states the figure of about 30 units. The State civil defense office indicates that this was either an estimate or a projection of known figures. It was not indicated in their records that actual structural modifications had been undertaken. We requested clarification for these figures because of the fact that they have not given specific answers to the questions but in most instances have indicated that the number given are estimates of what could be done, rather than what has been done. We will go into that in more detail and adjust our figures accordingly when we get statements which are more definite.

In addition, the Governors and mayors were asked to report on the development and preparation of evacuation reception centers in their jurisdictions and to submit any suggested changes in Federal civil defense policy which might provide greater fallout protection for the people.

On this point I might say many of the answers were completely ambiguous. When we asked how many reception centers had been set up, the answers frequently said, "We have designated such and such an area as being an evacuation or reception center," but in most instances there was no indication that anything had been done other than referring to a certain area as being a reception center. In other words, there had been no implementation by constructing or preparing buildings, or by the stationing of emergency supplies of medicine or food. So we have had a great deal of trouble in trying to get specific answers to our questions.

Most of the replies indicated that progress in developing evacuation reception centers has been limited largely to a simple designation of reception centers, as I said, with little being accomplished in the way of providing necessary food, medical, and other emergency supplies that would be required in a post-attack situation.

The proposed change in Federal policy most often suggested by the Governors and mayors would provide income tax deductions for personal expenditures on home fallout shelters. In general, widespread sentiment was expressed for some form of Federal financial assistance for all types of shelter construction.

The civil defense information contained in the replies from Governors and mayors will be made a part of the printed record. Anyone who has a special interest in any particular State or locality will be able to examine the material at the subcommittee office pending the preparation of the printed record.

Those who examine the material will find, I believe, that civil defense throughout the country as a whole is in a deplorable state. Some civil defense directors or heads of government are hopeful that progress will be achieved in the future. But there is no getting around the fact that little progress has been achieved to date.

Lack of progress applies to civil defense generally, but in the case of shelters particularly, it is evident, to me at least, that the national shelter policy has been a failure. I am not prejudging the testimony here today; I am simply adding up what the Governors and mayors have reported to me.

My concept of shelter protection requires more than education and exhortation. It requires a program of construction. Perhaps some headway has been made in the educational aspects of this matter, although the written replies to our questionnaire are not altogether in the same vein. Governor Brown, of the State of California, reports, for example:

> These conditions create a general public resistance to the current Federal do-it-yourself shelter policy. The policy is overly rigid, and lacks popular appeal. It is producing little in terms of accomplishment.

On the other hand, Governor Stratton of Illinois reports:

> I am gratified to report that there has been a rising tide of public interest in this subject. Moreover, public information media in the State have demonstrated considerable support for this vital program.

Perhaps the fact that one is a Democrat and the other a Republican makes some difference in the evaluation. Actually, the replies do not run along partisan lines. And, of course, our concern in this matter has no partisan motives.

Gov. Nelson Rockefeller of New York is chairman of the Governors' Conference on Civil Defense and one of those who tried actively to do something about fallout shelters in his State. His program for compulsory fallout shelters was rebuffed by the New York State Legislature. We invited Governor Rockefeller to tell us about his civil defense program. Governor Rockefeller expressed an interest in coming, but he is in the last days of the legislature at this time.

(The following letter was received from Governor Rockefeller's office:)

> STATE OF NEW YORK,
> EXECUTIVE CHAMBER,
> *Albany, March 23, 1960.*
>
> HON. CHET HOLIFIELD,
> *Chairman, Military Operations Subcommittee of the Committee on Government Operations, House Office Building, Washington, D.C.*
>
> DEAR MR. HOLIFIELD: As I explained to you on the telephone yesterday, Governor Rockefeller regrets that the probable extension of our current State legislative session through the latter days of this month will prevent his appearing before your committee on March 30, as you had suggested.
>
> He appreciates your invitation to meet with the committee at some later date. He is presently planning on a short vacation immediately following the end of the legislative session, and his plans thereafter are for the moment a bit indefinite. However, he has your invitation very much in mind, and I hope to be able to contact you again on this matter within the next few weeks.
>
> Sincerely,
>
> C. V. R. SCHUYLER,
> *Executive Assistant to the Governor.*

Let me make it clear in these hearings that we recognize that not everyone is in agreement on the need for strong civil defense measures.

There are those who believe that the weapon effects of massive nuclear attack are so overwhelming that civil defense is useless.

Others think that resort to a comprehensive shelter program would be a sign of belligerent intentions on our part; although, illogically,

they do not seem to entertain the same notions about the building of ICBM sites.

Still others believe that the expenditures for shelters are not justified and that we could better use the funds for adding to our ICBM capability.

There is no question, on the basis of scientific evidence, that shelters can save millions of Americans if they are exposed to nuclear attack.

Governor Hoegh himself said, when he outlined the national shelter policy to our subcommittee 2 years ago:

> In the event of a nuclear attack on this country, fallout shelters would offer the best single nonmilitary defense measure for the protection of the greatest number of people.

No one can say if, when, or how such an attack might come. But we must recognize that there is yet no international agreement for the control of nuclear weapons, and the possibility of nuclear war, whether intentional or accidental, exists.

Even while the United States seeks an international agreement which will provide reliable safeguards for keeping the peace, we must realize that this decade is not apt to see an abrupt disarmament. No nation, mindful of its security, would strip itself of its armament until confidence builds up that the mutual desire for peace is stronger than the threat of aggression.

This means that, as far down the road as we can see now, nuclear weapons will continue to be stockpiled, bombers and missiles will continue to be on the alert, and the world will continue to live in "peace through mutual terror." Under such conditions, a soundly planned civil defense is an essential undertaking for the United States.

I might add this observation, which I conveyed in a letter to President Eisenhower preceding the White House Conference on Civil Defense held January 25, 1960. (See app. II, p. 353.)

The United States will not agree to disarmament without practical enforcement measures. But the best inspection and control techniques that can be devised still entail risk. The risk cannot be lightly put aside, for it is the risk of disaster. The ultimate protection against cheating on disarmament and the key to a credible disarmament program could very well be a strong civil defense.

Now we will proceed to hear the first witness, Governor Hoegh. I see you have quite an extensive statement here. I shall not ask you to summarize it because I think it is important that we get this whole statement in the record and that you be allowed to present it in your own way. I hope you will bear with us if we ask questions during the period of the statement, because it is long. We shall try not to interrupt you any more than we feel necessary.

STATEMENT OF LEO A. HOEGH, DIRECTOR, OFFICE OF CIVIL AND DEFENSE MOBILIZATION

Shelter Statement

Mr. Hoegh. Mr. Chairman and members of the committee, at the direction of the President, the national policy on shelters was announced on May 7, 1958. You will recall, Mr. Chairman, that I made the first announcement of this policy before your committee on that date.

The policy evolved from an intensive, 2-year study by the major security agencies of the Government which demonstrated a great potential for the saving of life by fallout shelters. In fact, in the event of a nuclear attack on this country, fallout shelters offer the best single nonmilitary defense measure for the protection of the greatest number of people.

This policy has had the endorsement of a number of national organizations, among them, the Conference of Governors, the National Association of County Officials, and the American Municipal Association.

FALLOUT STUDIES

Studies by the Office of Civil and Defense Mobilization, the Department of Defense, the Atomic Energy Commission, and independent research groups indicate that an attack with surface-burst nuclear weapons on the United States would contaminate large areas of the Nation with radioactive fallout. Contamination would be widespread and in some situations long-lasting and intense. Without fallout protection it would cause substantial numbers of casualties and would lessen the survivors' ability to work. It would deny access to some areas for weeks to months for living and working.

At our request, the National Committee on Radiation Protection and Measurements, whose chairman is Dr. Lauriston Taylor of the National Bureau of Standards, undertook a comprehensive study of acute effects of fallout on man. A preliminary report from this Committee shows that an individual will not become incapacitated or his ability to work be seriously affected so long as his acute dose is kept below 200 roentgens. If the dose exceeds 200 roentgens over a short period, there will be radiation sickness requiring medical attention. If the short-term dose exceeds 600 roentgens, almost everyone so exposed will die. Therefore, in a fallout area, our objective is to limit the short-term radiation exposure to less than 200 roentgens and thus prevent radiation sickness.

Mr. HOLIFIELD. At this point, Governor, I would say you have not given any consideration at all to the genetic effects. I am sure genetic experts will be very much concerned about exposures of 100 or 200 roentgens as far as the effect upon the genes.

Mr. HOEGH. There is no question, Mr. Chairman, that that is true. What we are doing here, though, is to prescribe the minimum protection in order to keep down radiation sickness; and, secondly, to enable us to go on for the recovery action. We realize——

Mr. HOLIFIELD. In other words, you are concerned here with the somatic injury and not genetic.

Mr. HOEGH. That is right, sir.

Mr. HOLIFIELD. Of course, I would hope that your objective on radiation exposure would be much less than 200 roentgens because of the genetic factor.

Mr. HOEGH. Yes, sir. We, of course, are urged that we keep it far below 200 roentgens, but with this advice we do know that, while it has genetic effects and could cause leukemia, that it would enable people not to become ill and that they could go on working and have recovery action.

The National Academy of Sciences and the American Medical Association have strongly urged the construction of fallout shelters, since, in the Academy's words, "Adequate shielding is the only effective means of preventing radiation casualties," and further, "There is adequate technical knowledge to permit a program of construction of effective shelters."

LAND AREA AFFECTED BY FALLOUT

To indicate the size of the areas across the Nation where fallout shelter would be required to prevent radiation sickness after a nuclear attack, I shall refer to the testimony presented at hearings before your Special Subcommittee on Radiation in June 1959. From the hypothetical attack pattern, developed by your subcommittee, our analyses showed that 54 percent of the national land area had initial dose rates less than 10 roentgens per hour. For practical purposes, under a nuclear war economy, this portion of the country could be considered unaffected by fallout.

Thirty-one percent of the national land area had initial dose rates ranging between 10 and 100 roentgens per hour. In these areas the first floor of the home would provide sufficient protection to keep the radiation dose during the first 2 weeks below 200 roentgens, a sickness dose.

About 4 percent of the national land area had initial dose rates between 100 and 500 roentgens per hour. In these areas the home basement would provide sufficient protection to prevent radiation sickness during the first 2 weeks.

However, about 11 percent of the national land area had initial dose rates exceeding 500 roentgens per hour. Here the home, by itself, would not provide sufficient fallout protection to prevent radiation casualties. Fallout shelter would be required. It should be noted that, even though only 11 percent of the national land area required fallout shelter in this case, more than 25 percent of the surviving postattack population was located in these zones of heavy fallout. This is simply because the 71 largest cities in the United States were attacked in this study, and, beyond the zones of severe blast damage, the populous suburban areas were most seriously affected by fallout. The damage assessment of this attack shows that casualties could be reduced by about 20 million if survivors from blast and thermal effects had provided themselves with fallout shelters. Studies of attack patterns primarily on military bases, instead of population centers, show a dramatically larger percentage of lives saved with fallout shelters.

About 6 percent of the national land area had initial dose rates exceeding 1,000 roentgens per hour. That is in accordance with the attack pattern that your subcommittee used.

To prevent radiation fatalities and other casualties in these areas, people would require fallout shelter for about two weeks postattack. Further, at the end of this period they would have to be evacuated and the land abandoned for a few months until the fallout had decayed to acceptable limits or until decontamination had been accomplished.

ALL FAMILIES NEED SHELTER

As your study has indicated, Mr. Chairman, there probably will be large areas where homes and home basements will provide adequate fallout protection. However, there is no way of predicting where these areas will be. We will never know the precise ground-zero locations and weapon yields before the event, nor will we know the winds and weather more than a few hours before the attack. Locations which suffered little or no fallout in your subcommittee's hypothetical attack might have a very serious fallout condition under a different attack or with different winds. Consequently, all families should provide themselves with the fallout protection recommended in our family fallout shelter manual. With this standard of protection, all of our people who survive the initial blast and thermal effects could survive the effects of fallout in a nuclear war.

Let me repeat. In the event of nuclear attack on this country, fallout shelters offer the best single nonmilitary defense measure for the protection of the greatest number of our people.

Mr. HOLIFIELD. I want to say, Governor, I heartily concur in what you say here. We have tried to make it very plain in our report that the hypothetical attack was a hypothetical attack, and it did not necessarily mean that the attack would be in that manner, and probably the mathematical chances of its being just exactly like that would be one in a million. The general type of the attack might vary, the wind currents might vary, and of course the degree of radioactivity dumped upon the population might vary sharply. It might be twice or three times that amount in a full-scale attack.

It boils down to the summation which you make here, that in the last analysis, as long as you do not know where the attack will hit, you have to plan the type of fallout shelter which can be universally used and which would be useful in the event of an attack, regardless of where it occurred.

Mr. HOEGH. Yes.

ELEMENTS OF THE POLICY

The national shelter policy has the following elements:

(1) The Administration is bringing to every American all of the facts as to the possible effects of nuclear attack and is informing him of the steps which he and his State and local governments can take to minimize such effects.

(2) The Administration is conducting surveys of existing structures on a sampling basis, in order to assemble definite information on the capabilities of existing structures to provide fallout shelter, particularly in the larger cities.

(3) The Administration is accelerating research in order to show how fallout shelters may be incorporated in existing, as well as in new, buildings—whether in homes, other private buildings, or governmental structures. Designs of shelters are being perfected to assure the most economical and effective types.

(4) The Administration is constructing a limited number of prototype shelters of various kinds, suitable to differing geographical and climatic areas. These are dual-purpose shelters which will have practical peacetime uses. Upon completion they will be tested by actual occupancy by differing numbers of people for realistic periods of time.

(5) The Administration is providing leadership and example by providing for the incorporation of fallout shelters in appropriate new Federal buildings hereafter designed for civilian use. Federal example is an indispensable element to stimulate State, local government, and private investment for fallout shelters. Community use of shelters in these new buildings is contemplated since the Federal employees occupy the structures less than one-fourth of the time.

(6) The Administration is endeavoring to incorporate fallout shelter in existing Federal buildings to provide leadership and set an example for the owners of existing commercial and industrial buildings.

No massive federally financed shelter construction program is contemplated. I shall describe each of these points in some detail later.

SHELTER APPROPRIATIONS

Our estimate of the initial appropriation requirements for this program was forwarded by the President to the Congress in July 1958 as a supplemental request to the fiscal 1959 budget. The President asked that $13,150,000 be appropriated to carry out the national shelter policy. The Congress appropriated $2,500,000.

In fiscal 1960 we requested $11,270,000 for this program and received $5,384,000. In addition, General Services Administration requested $2 million to provide fallout shelter in existing Federal buildings in order to set an example for both Government and industry. This request was denied in its entirety. We also asked $2.7 million for the construction of a regional underground facility at Denton, Tex. $2.4 million was appropriated.

For fiscal 1961 we have requested $7,910,000. In addition to this amount, General Services Administration is requesting $3.8 million to provide fallout shelter in certain selected buildings which represent part of the relocation arc to which Federal agencies would move in the event of an attack. The national shelter policy calls for inclusion of shelters in all future Federal construction. The fiscal 1961 budget contains about $11.5 million for this purpose. The 1961 estimates are pending before the Congress. GSA has again requested the appropriation of $2 million for shelter in existing Federal buildings.

In summary, to implement the national shelter policy in fiscal years 1959 and 1960, the President has asked for $29,120,000 and received $10,284,000. There is still pending before the Congress his request for fiscal year 1961 the sum of $21,410,000 to implement this shelter policy.

The first point I would like to discuss is that pertaining to information, which is part of the policy of our National Administration on shelters.

Shelter Policy

POINT 1—INFORMATION

Information and education programs are vital to the shelter policy. The first need for action by the individual citizen is knowledge. Americans must know the "why" and then, the "how" of shelter protection to be motivated to protect their families. For this reason, when the national shelter policy was announced, one of the six major points was education and information aimed at developing both

awareness and action by the people. Remarkable progress has been made.

Mass media have been giving increased attention to every aspect of civil defense and particularly, to the importance of shelter.

Radio.—Starting with radio, the "Stars for Defense" show, a half-hour series containing civil defense messages, is used by 2,280 stations in weekly programs.

A similar recorded show, "Entertainment USA," is heard on the CBS radio network, on Saturdays, and a 15-minute program of the same type is broadcast regularly over the ABC radio network.

Additionally, we distribute transcriptions of 10 one-minute survival messages which are used by radio stations on public service time.

To accommodate stations wishing to use their own announcers we have developed "Radio Kits." These packaged units contain copy for 10, 30, and 60 second announcements to be read during public service time.

In aggregate the commercial value of radio time donated by the networks and local stations in the last 2 years is estimated at $42 million. OCDM's investment was $346,900. In other words, for every dollar we spent, we received $122 in commercial time.

Of course the impact involves something more than statistics. The constant repetition of transcribed and live announcements penetrates deeply into the public consciousness and provokes a response not measurable by ordinary methods. It can best be described as "attitude" and I am convinced the "attitude" of the public has been changing for the good.

Television.—We are also making maximum use of television. We have created a series of television packages containing spots for use during public service time. These announcements have been received enthusiastically by television stations throughout the country. Dangers of fallout and the importance of shelter have been stressed. Because the response has been excellent, we have recently produced spots which show the various everyday uses of home shelters.

In 1959 OCDM presented a 10-week television series in cooperation with the Educational Television Center at Ann Arbor. The series, "Ten for Survival" was produced by NBC for OCDM. It covered, in documentary form, many of the natural disasters which Americans have sustained in recent years. Using the techniques of newsreel footage and personal interviews with survivors, this series demonstrated that people armed with knowledge and foresight, are able to withstand the most difficult crises. Again and again the message carried by these stories is "the key survival is preparation." This excellent series won favorable comment and to date has been shown on over 100 television stations.

During the past 2 years the value of television public service time donated by stations and networks is nearly $15 million while our costs have been but $524,500 including motion pictures for use by television.

Motion pictures.—Motion picture activities of OCDM include films made for general distribution and those covering special aspects of civil defense. The film, "Your Civil Defense," completed a year ago, documents the preparedness actions being made by government at every level, by industry, by nongovernmental organizations and by the individual citizen. It demonstrates how the many aspects of

preparedness are meshed in the nationwide effort. It is our basic film for general release.

Films covering special topics include:

(1) A recently completed half hour film on radiological defense created to inform the public about the nature of fallout and the defense measures against it.

(2) A one-half hour film on civil defense in the Nation's schools. This film will orient school officials on the steps necessary to prepare their schools for any emergency.

(3) A training film on home nursing in emergencies is being planned in conjunction with the American Red Cross. When completed it will support training programs conducted by the Red Cross, and will be available for general distribution.

OCDM now has 22 current films in circulation. They were shown to approximately 90 million people in the last 2 years.

The press.—The OCDM press information and magazine division is finding a wide reader interest in civil defense subjects. One national circulation magazine last year generated more than 40,000 written queries to our office for home shelter plans. About 200 professional and technical magazines, national organization publications and association and industry periodicals carried shelter articles in the last 2 years. Records of clippings indicate that more than 25,000 news stories, articles and editorials in support of the national shelter program have appeared in newspapers around the country.

Press information routinely involves the issuance of advisory bulletins, press releases, and information bulletins, which describe significant events in civil defense. OCDM also publishes a news feature and picture page which goes to the Nation's 11,000 weekly and daily newspapers on a regular basis. Recently over 3,000 newspapers published quarter-page to full-page picture stories on the family fallout shelter, as public service. Also, books and pamphlets satisfy an important need in educating the public. Most were furnished on direct request of State and local government officials.

The booklet "Family Fallout Shelter" is a case in point. Published last year, this manual gained wide acceptance from the start. It contains blueprints for five types of fallout shelters, one of which can be built for as little as $150. It also provides a list of survival items which should be stocked in shelters. The writing is clean, crisp, and easy to understand. To date, we have distributed over 15 million copies of this booklet.

An earlier publication, "The Handbook for Emergencies" was distributed in late 1958. In this instance, OCDM worked with the Boy Scouts. The splendid cooperation we received deserves special mention. Enlisting the aid of young Americans throughout the country, the Boy Scouts literally hand carried this publication to 37 million American homes.

Other popular pamphlets are "What You Should Know About the National Plan," and "What You Should Know About Radioactive Fallout."

Even larger distribution has been made of a simple wallet card outlining the five steps to personal protection, including shelter. More than 40 million cards containing these important reminders have gone to the American people.

Exhibits.—The exhibits program conducted by OCDM has gained new dimensions in the past 2 years. Nearly 2,500,000 people saw 16 major exhibits displayed throughout the country in 1959. As we moved into 1960, stress was laid upon shelter exhibits as a part of the prototype shelter program. To date these pilot shelters have appeared in 50 home shows. In January, a fully decorated shelter built in cooperation with the American Institute of Decorators was displayed at the American Institute of Decorators Home Show in Chicago. More than 125,000 people viewed and examined this colorful design. Since its Chicago appearance this dual-purpose room has been exhibited in New York City and Detroit, and will be in Milwaukee next month.

Similar promotions are underway with the Structural Clay Products Institute, the National Concrete Masonry Association, and the National Lumber Manufacturers Association. The design of shelters built from their products will meet OCDM specifications.

In 1959 5,298 billboards, over 350,000 streetcars and buses, and 71,000 post offices displayed our "Facts About Fallout" poster 30 days or more without charge. In 1960 they will display our "Shelter" poster without charge.

Briefings.—We provide trained briefing officers for conferences, seminars, and meetings. Prepared briefings are supplied on request to regional offices, local and State civil defense organizations, and private groups. These briefings covers every aspect of civil defense and are augmented by excellent visuals. More than one thousand briefings have been delivered to more than 56,000 key leaders in government, industry, and community life.

OCDM takes full advantage of events which justify special promotions. In line with this policy, December 7, Pearl Harbor Day, also marks Civil Defense Day. On this occasion we remind the American people that preparedness is crucial to their safety. In 1958, the commemoration was highlighted by a half hour filmed telecast dramatizing how the attack on Pearl Harbor convinced citizens of Hawaii they must have a strong civil defense program. The film entitled, "No Time To Lose" was produced for OCDM by NBC and telecast nationally. Copies of the film are now distributed upon request to local station and civic organizations.

There is no typical special promotion. They range from essay contests sponsored by the Ladies Auxiliary of the Veterans of Foreign Wars to kits prepared for the American Legion as part of its development of light duty rescue squads. Whenever and wherever such ideas have real merit, OCDM provides its facilities and its know-how in bringing about a successful campaign.

As a result of the educational effort, several homebuilders are including built-in shelter in their new housing projects. Among the first was a Denver builder, Jack Hoerner, who has attracted widespread interest from homebuyers for his houses with fallout shelter as an integral part. Others have followed in other parts of the country. In January, I addressed the National Convention of American Home Builders Association, challenging their 400,000 members to each build 10 homes with shelters in 1960.

As in all appearances I stressed that no home in this nuclear age is modern without a shelter.

Organization help.—It is often said that we are a nation of joiners. Early in 1959, OCDM formed a National Organizations Office. Its purpose is to inform and excite to action the varied currents of American life which crystallize opinion and find expression through labor, industrial, spiritual, farm, and professional organizations. The help we have received from this source has indeed been gratifying.

The objectives of the shelter policy have been endorsed by such organizations as Kiwanis International, AMVETS, Marine Corp League, the Junior Chamber of Commerce, the American Legion and many others. Many organizations are urging local posts to include shelter in their new buildings.

National organizations also furnish an excellent means for civil defense literature to reach the public. For example, by working with 100 of more than 1,400 trade associations, we have reached 15,000 affiliate companies and their 3 million employees. Grassroots support of shelter has been obtained with a distribution of more than 17,000 copies of "The Family Fallout Shelter" by 757 church executives and editors. Five labor publications with a total circulation of 1,200,000 carried special articles on fallout shelter in recent months. The worth of these programs can best be understood by citing one publication, the Electrical Workers' Journal. This magazine reaches 750,000 members and presently carries detailed instructions for building a home basement shelter. I could go on, but the point is made. As much as we have accomplished, we have barely scratched the surface in getting to the American citizen through the agencies which represent his special interests. We are determined to increase use of this source.

Action by organizations.—Of equal significance are the action programs undertaken by a wide variety of organizations. For example, 44 prototype shelters have been put up in 19 States with labor donated by locals of AFL–CIO building and trade unions. One hundred more will be built. The American Telephone & Telegraph Co. now plans to provide shelter in approximately 23,000 plants and facilities of the Bell System. Various brick manufacturers are providing material for prototype fallout shelters for any home show in any city in the United States. The International Bricklayers, Masons and Plasterers Union is erecting the shelters.

In the forefront of civil defense preparedness are companies such as Jones & Laughlin Steel Corp., the Standard Oil Co., of New Jersey, the General Electric Co., Chase Manhattan Bank, United Aircraft, the Du Pont Co. and many, many others.

I might mention here, within the last 2 weeks I visited the plant of Jones & Laughlin Steel Corp. at Pittsburgh, Pa., and there I observed shelters for their 17,000 employees in the Pittsburgh plant. They have also provided for fallout shelter protection for their 55,000 employees at their 60 different locations.

Mr. HOLIFIELD. What type of shelter protection is that?

Mr. HOEGH. In the ones I saw at the Pittsburgh plant, they had 6 feet of concrete above them. I would say they would have even blast protection, with the exception of blast doors. The steel industry of course lends itself to providing fallout shelter with very little additional expense.

Mr. HOLIFIELD. Are these special buildings or modifications?

Mr. HOEGH. These are modifications of the existing structures to afford them fallout protection.

Mr. HOLIFIELD. Are they above ground or below ground?

Mr. HOEGH. Below ground.

About 6 months ago I was up in Hartford, Conn., and there I saw the fallout shelters of the United Aircraft Co. They have shelter protection up there for their 12,000 employees. Not only do they have the fallout protection, but they also have the food and the water in place, prepared to take care of them.

These companies, I might add, go further than this. They inform their employees that they should have this protection at their own homes, and they are trying to stimulate that type of protection within the employees' homes. The know that, in the case of nuclear attack, the greatest resource they have is their skilled employees.

We work hand in hand with any corporation wishing to improve the protection of its plants and its preparedness.

We have also invited more than 8,000 industrial, commercial, and financial firms to cooperate with State and local governments in the Operation Alert scheduled for May 3 and 4.

To make this exercise as realistic as possible, we have selected a dozen industries which have agreed to run through resource problems consonant with the magnitude of the attack, from their corporate emergency headquarters. Such drills give us a better idea of our resource problems and enable corporations to train and test the extent of their preparedness. Thus, we concern ourselves, at one and the same time, with preattack planning and planning for recovery.

Rural civil defense.—In November, we began a carefully worked out program to inform rural families about the radiation threat and defenses against it. The purpose is to urge both farm and nonfarm families in rural areas to build family fallout shelters. It also encourages the farm families to take measures which will help protect their livestock.

This program has the backing of all the national farm organizations. It has been endorsed, and has the active cooperation of the American Association of Land Grant Colleges and State Universities, and the Department of Agriculture.

A pilot program last summer in Gratiot County, Mich., proved that America's rural population was ready to implement the shelter policy. After the board of county supervisors approved the program, civic leaders were briefed and began erecting shelters or finding excellent shelter space. The county extension and home demonstration agents assumed educational leadership; 4–H Clubs participated, and the Farm Bureau, the Grange, and the Parent-Teachers' organizations made radiation information and shelter a basis of their meetings.

The people of Gratiot County today are informed. Many families have fallout shelter. The pamphlet "How It Was Done" gives more details.

Personally, with Governor Williams of Michigan, I visited eight of these family fallout shelters which were very adequate. I was informed at that time, about 2 or 3 months ago, that in that one county alone they had 150 or more prepared fallout shelters with supplies and equipment. Some of these were quite interesting. I saw an abandoned cistern which had been converted into a fallout shelter.

It is quite remarkable what they can do if they have the knowledge plus the information to stimulate action.

Rural civil defense is underway in 48 States; 28 have completed organization of their rural civil defense councils and have been instructed on how the program will be carried out in their States; 38 States already have received full support of their agricultural colleges, and 30 of these have completed instruction of their extension services.

Training of county leaders is proceeding in 27 States and completed in 19.

The program was designed to begin reaching farm families in the fast-moving States in February. Our March 1 report from the State directors indicated the local action program was underway in 19 States.

The pilot project in Gratiot County, the enthusiasm of the farm organizations, the solid support of the State extension divisions, and early reports from local counties where the action program is underway, indicates rural America will make an outstanding contribution.

Mr. HOLIFIELD. Before you leave that point, you do not indicate that this is typical of the counties of the country throughout the Nation?

Mr. HOEGH. Gratiot County?

Mr. HOLIFIELD. Yes.

Mr. HOEGH. No.

Mr. HOLIFIELD. Is that an exceptional case?

Mr. HOEGH. Yes. That was a result after we went in there with an intensive educational program for 30 days. It proved so successful that rather than rely on our general information and education program, we thought we should go to the rural audience especially, just as we did in Gratiot County. I expect to see the same results in other counties where this is put into effect. As you know, you have to get this information to the farmers in January, February, March, and maybe part of April. From then on, they are quite busy until next September or October. Again at that time, we will accelerate the program in order to get about the same results we had in Gratiot County.

Women's activities.—The Nation's homemakers are the traditional custodians of the family. This responsibility goes hand in hand with the aims of civil defense. Since the home-protection work-shop program began last fall, we have held more than 1,600 home work shops attended by more than 60,000 women. About 2 million award kits have been packaged for distribution to families to help them meet requirements for civil defense preparedness in the home. Since January, more than 25,000 homes have been presented awards indicating the families are prepared. We maintain continuous and close liaison with 71 national women's organizations representing more than 63 million women. A special newsletter reaches 40,000 women and more than 7,500 tabletop exhibits have been displayed at local, State, and National conventions. The emphasis of this material is shelter—the shelter which can assure survival for the families these women represent.

Education and training.—A major aspect of keeping the American people alert to the dangers of fallout and mindful of the defenses

against it lies in the field of education and training. Expert knowledge is the requisite for calm and efficient action and for protection in a crisis.

The OCDM training and education program has four major objectives:

(1) Training of government officials and technical specialists for government survival and operation in emergencies.

(2) Training in radiological defense.

(3) Incorporating nonmilitary defense into curricula and assisting in self-protection in schools and colleges.

(4) Coordinating nonmilitary defense training in Federal agencies.

The Staff College located at Battle Creek serves key leaders in government and important professional and industrial groups. Courses including information re nuclear weapons, attack assumptions, radiological defense, basic defense measures, the national plan for civil defense and defense mobilization, furnish invaluable information to these people who occupy key positions.

In addition to resident Staff College activities, a program of training is conducted in States to assist them in developing their own training activities. This extension project makes it possible for traveling teams of Staff College instructors to help States build a training capability in local institutions. Universities and colleges most often provide the facilities and personnel within the State to establish this capability.

As the curriculum of the Staff College takes shape, more students from every State in the country attend courses. Since 1958, more than 3,000 men and women have been graduated from the Staff College, and traveling teams have given instruction and guidance to more than 300 key persons.

Three training centers augment the Staff College. The Eastern Instructor Training Center at Manhattan Beach, N.Y., which opened in May 1958; the Western Instructor Training Center in Alameda, Calif., which opened in November 1959, and the school in Battle Creek, which has been operating since 1954.

The chief difference between the staff college and these regional training centers is not the courses they give, but the students they teach. The staff college trains key executives of government, industry, and professional life. The training centers are set up to train instructors who, in turn, will teach others in local communities.

Let me give you one example. We instructed five of the police force in New York City on radiological defense. These five in turn went back and have instructed over 2,000 policemen in New York City on rediological defense. We feel that by this method we can accomplish the greatest acceleration.

Again, the stress is on shelter. Of the twelve courses taught at these training centers, ten relate specifically to the national shelter program.

The curriculum of the Radiological Defense School in Battle Creek is almost wholly concerned with shelter and other phases of defense against fallout. Significantly, it attracts the largest number of students. Last year, 533 persons from 35 States, Puerto Rico, and the Canal Zone completed the Radiological Defense School course. This

means 533 additional instructors competent to teach in their local areas.

With the organization phase nearing completion, we expect a marked increase in enrollment. We expect to train about 3,500 leaders, auxiliaries, and instructors in 149 courses during fiscal year 1960. There are now 62 State and local civil defense training schools which carry on this type of instruction.

Another phase of education and training activities is the adult education program. Developed specifically to implement the education responsibilities set forth in the national shelter program, this approach was developed in 1959 with pilot projects set up in the States of Florida, Kentucky, Minnesota, and Texas.

It is designed to reach the individual citizen through the established channels of the adult education movement throughout the country. To accomplish this, OCDM entered into agreements with the U.S. Office of Education. This arrangement permits the U.S. Office of Education to contract with selected States for pilot projects in the field. OCDM prepares instruction material used by State facilities in planning and conducting courses. The State office of education administers the program. Topics treated in the interim curriculums used for this testing phase include such titles as "The Effects of Nuclear Weapons," "Radioactive Fallout," "Home Shelters," "Improvised Protection," and "Recommended Survival Actions."

During the closing months of 1959 attention was focused on training instructors to implement the program. By the end of December, close to 1,200 teachers had been qualified. To date, 12,299 people have taken complete courses in adult education and 7,406 are presently in training. In March, 20,000 persons were attending classes. By the end of June 1960, 90,000 people will have been trained. I should point out that these results were produced with only a small cadre of trained instructors. But the program has received excellent acceptance and our early expectations are being exceeded. With the program extended to three more States in 1961 we can expect to realize even better results.

The fourth phase of our education and training activities is closely related to the adult education program I have just described. It concerns the use, on a broad front, of the educational system throughout the country to incorporate nonmilitary defense instruction into the curricula.

This program is education as opposed to training. To be more specific we devote considerable effort to persuade schools and colleges to advance civil defense. Through active participation in conferences and meetings of national education associations we have been able to convey the urgency of relating civil defense to the broad objectives of a school curriculum. In many instances this has led to publication of support material. For example, the booklet "Disaster Protection Handbook for School Administrators,' was prepared in cooperation with the American Association of School Administrators. The manual "School Boards Plan for Disaster Problems," was developed in cooperation with the National School Boards Association. There are others of this type, all of which deal extensively with shelter.

Civil defense in textbooks.—However, our efforts are not limited to support publications. The American Textbook Publishers Institute, an agency that represents approximately 97 percent of the Nation's textbook authors, editors, and publishers, has arranged to include civil defense subjects in textbooks. Accordingly, new textbooks are reviewed with this in mind, and OCDM supplies technical information to meet specific requests. As our capability increases we plan to offer direct assistance to textbook publishers in preparing material.

OCDM has augmented this service with special projects in radiological defense. Some 14,500 kits of radiation detection instruments have gone to high schools and colleges where they are used in science curriculums. The curriculum includes weapons effects, protection by shelter, and operation of the instruments. In the 1958–59 school year 1 million students were taught. In 1959–60 over 2 million students are being given this instruction. This approach has the added advantage of geographically distributing both instruments and trained monitors throughout the Nation.

We also have enlisted George Peabody College for Teachers, one of the Nation's leading teachers' colleges, in the development of a program for teacher education. The college is currently publishing materials aimed at stressing the teachers responsibility for educating our children to live and survive in the nuclear age. During 1960 this material will be furnished without charge to teacher training colleges throughout the Nation.

Colleges and universities are also encouraged to offer accredited civil defense courses on campus, through extension services, and over educational TV channels. Many colleges and universities are conducting courses in general civil defense.

Under the delegated authority of the President, the U.S. Office of Education of the Department of Health, Education, and Welfare has helped to advance nonmilitary defense in schools. In addition to the adult education program I have already discussed, the U.S. Office of Education provides an excellent channel of communication with State education offices.

A list of some recent publications reveals the strong shelter orientation of our current education activities: "The Handbook for Radiological Defense Education," "Facts and Action in the Nuclear Age," "Basic Civil Defense."

In addition, the training which has been carried out in schools across the country has provided a formidable number of Radiological Defense instructors and monitors. State and local governments in the United States report a total of over 156,000 trained RADEF monitors and 16,000 RADEF instructors. An even larger number of potential leadership exists in case of emergency. I refer to the 3 million students who will have received instruction in radiological defense by June 1960.

Several projects undertaken by outside agencies merit special comment. The resident course of the Industrial College of the Armed Forces devotes a portion of its curriculum to civil defense. Our exchanges of lecturers with the military staff schools have greatly assisted in achieving civil defense action and understanding by uniformed members of our active defense forces.

The extension division of the Industrial College also performs a significant role in educating Reserve officers and industrialists through an excellent correspondence course and national security seminars held in 14 cities annually. Of the 31 lectures which make up the course, 7 are on civil defense. Because these lectures have enjoyed such wide appeal, 15 of them were recently adapted to half-hour movies now shown on the Educational Television Network. One of these films, prepared jointly by OCDM and the Industrial College, describes the entire civil defense effort with a heavy stress on the importance of shelter.

Organized labor assists.—The American labor movement has been instrumental in developing a training capability for its membership. Last year pilot studies were conducted by OCDM in conjunction with six international unions of the AFL–CIO. Courses given at labor schools operated by these unions were examined with the aim of shaping civil defense content to the curriculum.

Students, for the most part, come from the leadership of the unions. Under the present plan, each affiliated union will develop five 1½-hour courses for workshops and seminars. These courses will cover nuclear energy, civil defense for trade unionists and their families, defense mobilization responsibilities for leaders, radiological defense, and the use of nuclear energy.

As a starter, we anticipate that this program will reach eight schools during 1960. The potential for succeeding years is a total of 140 established summer schools attended by 10,000 trade union leaders.

Inevitably the proof of success in this broad effort to bring knowledge and education to the American people must be found in the results. While it is difficult to measure public awareness and action, we know that many shelters are being built, that more and more communities are incorporating shelter in public projects, and that industry is providing shelter for its employees at an increasing rate.

Further evidence is the fact that more and more Americans take part in regular civil defense exercises each year.

Recent studies by the State of New York have given rise to a forthright, firm and forward looking program recommended by Governor Rockefeller to assure adequate protection against fallout for the people.

What this means is that given the facts the ordinary citizen can do extraordinary things. We have moved rapidly from the awareness stage to the logical next step—concrete action which results in protection for our families, our communities, our States, and thus the entire Nation.

POINT 2—SURVEYS

The second element of the national shelter policy calls for a survey of existing structures to determine their potential for fallout shelter.

In 1956 the National Bureau of Standards initiated, under our sponsorship, a research program to provide data on radiation penetration, and to develop procedures for analyzing the shielding afforded by ordinary structures.

Considerable progress was made during the ensuing 2 years, and shortly after the announcement of the national policy on shelters, the Bureau of Standards and the Office of Civil and Defense Mobilization devised the methods for applying the data. This resulted in the

publication of the "Guide for Fallout Shelter Surveys" in December 1958.

At the same time, a task force from OCDM surveyed five Federal buildings in Washington, D.C.—the Departments of Agriculture, Labor, and Commerce; the Supreme Court; and the Treasury. Together these buildings have a day-to-day population of approximately 20,000 employees. Inspections revealed that these buildings have within them protected space which could be converted into excellent shelter for approximately 32,000 people.

The greatest potential increase in shelter capacity appears in the case of the Supreme Court Building. This building normally accommodates only 520 persons. By merely installing fixed equipment to provide emergency electric power, water, ventilation, and sanitary facilities at a cost of $89,100, the same building would provide 5,000 shelter spaces.

In the Treasury Building, installation of emergency equipment at a total cost of $91,800 would provide shelter for some 3,020 persons. The average cost per person would be $30.40.

The Department of Agriculture would provide shelter space for 10,800 at an average cost per person of $20.80. The Department of Commerce would shelter 8,300 persons at an average cost per person of $22 and the Department of Labor and ICC buildings would protect 5,000 at an average cost per person of $17.40.

Mr. HOLIFIELD. This perhaps will show there is tremendous capacity for the use of existing facilities throughout the Nation, in the way of underground basements. We need modifications in the way of protective doors, shielding for windows and emergency supplies. This shows graphically that a shelter program would not necessarily mean the building of new construction.

Mr. HOEGH. That is right.

During the latter half of 1958, the firm of Technical Operations, Inc., made an experimental study for OCDM of the radiation attenuation characteristics of an Army barracks type structure of heavy brick construction, located at abandoned Fort Strong, in Boston Harbor. This isolated location permitted the use of radiation sources producing intensities greater than would be acceptable under peacetime standards for a built-up inhabited area.

The building is three stories in height, with a slate roof, and has about 25 percent window openings. The radiation doses inside the structure resulting from the sources on the roof and on the ground outside were measured by dosimeters. The results indicate a protection factor of about 30 for the first floor, 22 for the second floor and 11 for the third floor. While these protection factors are much better than for above-ground floors of conventional residences, may of our public buildings could be expected to offer this degree of protection. and in many instances more, because here you have 25 percent of the structure represented by windows.

Pilot surveys.—Four pilot fallout shelter surveys were initiated in fiscal year 1959, funded from research appropriations, in order to establish the potential of existing buildings and other structures to provide fallout shelter, and to establish and test the detailed procedures, techniques, and probable costs of such surveys. These surveys included Tulsa, Okla.; the city and county of Montgomery,

Ala.; a suburban area, Contra Costa County, Calif.; and six sample areas in Milwaukee, Wis.

These pilot surveys indicated in general that—

(1) There is significant fallout protection in existing structures.

(2) Existing shelter capacity can be increased by habitability improvements at an average cost of $25 per improved shelter space.

(3) There is need for additional shelter space to accommodate the total population.

(4) There is a lack of adequate shelter in residential areas.

The shelter survey in Tulsa, Okla., was completed at a cost of $9,090.60. This represents an average cost of $2.63 per structure for the 3,444 structures analyzed, or an average cost of 12 cents per person for the 73,061 peak daytime population.

The survey found 69,500 shelter spaces that had a protective factor of 50 to 250. The survey also showed that 9 percent of the people in the residential area had this protective factor.

The shelter survey conducted in the city and county of Montgomery, Ala., was completed at a cost of $37,500. This represents an average cost of 87 cents per structure for the 43,185 structures analyzed, or an average of 22 cents per person for the 172,500 peak daytime population.

The survey found 328,390 shelter spaces. Of this number, 6,896 had a protective factor of 50 to 250.

The city of Montgomery is planning for the improvement of the shelter areas in the 80 structures that will show the greatest increase for the least cost. It is expected that shelter space with an adequate protection factor can be provided for the entire population at a minimum cost.

The scope of this survey included refinement of methods and techniques, and it is expected that survey costs might be reduced to approximately 50 cents per structure or 10 cents per person, whichever is greater.

The other surveys generally confirmed the above findings.

Early in 1959 the survey guide was updated. Contractors for the four pilot surveys were furnished copies of this guide for use in completing their surveys.

Other approaches were investigated. The University of California made a study using aerial photo techniques. There appears to be some merit to this approach, especially for rural areas where a saving of time and funds could be realized. We expect to make a direct comparison of this method and the conventional method, under controlled conditions, in the State of Delaware this year.

Shelter guide.—In June 1959, we conferred with the Civil Defense Committee on the Scientific Working Party, NATO, to compare information on radiation protection. Another meeting was held in October 1959, and the results of these conferences and agreements were reflected in the latest edition of the "Fallout Shelter Surveys: Guide for Architects and Engineers."

The AEC cooperated with OCDM in testing the theories developed and members of the Subcommittee on Radiation Shielding of the Committee on Civil Defense, National Academy of Sciences, aided in the development of procedures described in the "Guide for Architects and Engineers."

Prior to the completion of this latest guide, appendix 1 to annex 10 of the National Shelter Plan, NP–10–1, "Fallout Shelter Surveys: Guide for Executives," was published as background information for executives responsible for planning and directing fallout shelter surveys. It reflects the experience gained in the four pilot surveys and outlines procedures for making surveys of existing structures.

In October of 1959, the Eberle M. Smith Associates, Inc., architects-engineers, made a report on certain industrial buildings which they had surveyed under contract with OCDM. This survey report created a great interest in the industry.

Current Federal operational surveys: The objectives of operational surveys, in accordance with annex 10 of the national plan, are—

(1) To provide a basis for national fallout shelter planning.

(2) To identify the quantity and locations of fallout protection normally existing in the Nation.

(3) To determine what existing structures can and should be modified to afford fallout protection.

The action required by the Federal Government is to "Survey existing shelter on a sampling basis in cooperation with State and local governments and private organizations."

The Federal fallout shelter survey program received $500,000 for fiscal year 1960. These funds have been programed to survey New York City, N.Y.; Los Angeles, Calif.; Tallahassee, Fla.; and the State of Delaware. We have requested $2 million.

In both New York and Los Angeles, the Federal funds need to be supplemented with contributions in kind from the cities. These may take the form of key personnel, office space, accounting systems, equipment, administrative management, printing services, and supplies.

These shelter surveys can best be performed by a task force type organization; one developed to meet the needs of a particular locality. With leadership provided by the local civil defense director, the training and knowledge gained remains with the local government, to be used in developing its shelter program.

Non-Federal operational surveys: On the State and local government level we expect to have fallout shelter surveys conducted by them with OCDM guidance and training. We expect at least one city in each State to initiate its own survey this calendar year. Such action will provide the basis for an accelerated survey program at the State and local level.

A workshop was held March 2–4, 1960, to train our regional personnel and industry representatives in survey techniques.

Each Governor has been requested to initiate a shelter survey of all State-owned buildings, in keeping with the resolution on civil defense adopted by the 31st annual Governors' conference at San Juan, P.R., in August 1959, which recommended such a survey program.

Federal shelter survey program, fiscal year 1961: Fiscal year 1961 budget estimates include the amount of $1,500,000 to continue this type of survey and to develop the techniques needed for State and local governments to complete them for their various jurisdictions.

We will provide Federal leadership, guidance, and example for State local governments throughout the Nation. The localities selected will be expected to provide assistance in the way of civil de-

fense employees who will become indoctrinated in the program and, therefore, be able to maintain the information in a current state, develop shelter utilization plans, and supervise shelter improvement programs.

After fiscal year 1961 it is expected that this federally financed shelter survey program will have stimulated other State and local governments to accomplish fallout shelter surveys and shelter improvements, and develop and implement shelter utilization plans, without Federal funds other than possibly some assistance by way of the administrative contributions program.

MONTGOMERY, ALA., SURVEY

Mr. HOLIFIELD. While you rest your voice a moment, let me take you back to page 4 of the last statement.

You mention a situation in Montgomery, Ala.

Under date of March 3 we received a reply from the Montgomery city-county civil defense headquarters, which reads as follows:

Your letter of February 10 to Mayor Earl D. James, city of Montgomery, Ala., has been referred to the undersigned for reply.

In the order that the questions were raised in your letter the following information is submitted:

(1) Three civil defense home shelters have been constructed in our city. This information would not necessarily be reflected in building permits issued during the past 2 years. We know of two other civil defense home shelters built in neighboring support counties for which we furnished technical information.

(2) No public buildings in our city have been modified to provide shielding from fallout. Provision has been made for sandbagging windows, water for wash down of roofs and utilization of existing water curtains in the event of radioactive fallout. A new building soon to be constructed by the Alabama Power Co. will provide consideration of this factor.

(3) Our local civil defense agency, which includes the city and county of Montgomery, Ala., does not have an underground control center, but it is contemplated that it will be in a below ground basement.

(4) No underground structures having a dual civil defense purpose, such as parking garages, have been constructed in our city.

(5) No fallout protection in the form of structural modification has been incorporated in any of our public schools. The construction of a prototype community shelter is to be in one of the high schools. The board of education, which operates both the city and county schools, is considering and it is believed will pass the requirements that all new school buildings take the fallout protection factor into consideration when they are constructed. Both the city and county governing bodies are considering the same requirement as the school board, insofar as it applies to buildings constructed with city or county funds.

(6) No evacuation-reception centers have been prepared for use by evacuees from our city in the event of an emergency. It is not felt that they are required.

(7) We do not believe that there are any changes in Federal policy necessary to achieve greater fallout protection for the people of our city. It is believed that the greatest assistance can be provided by—

An intensification of stressing radioactive fallout home shelters;

A fallout protection factor be incorporated in all new public structures;

An evaluation of existing structures to afford radioactive fallout protection to the population;

Private construction be encouraged to incorporate this feature in their buildings.

It is noted that you would be interested in any other comments we may wish to make concerning shelter requirements in the operation of the national

civil defense program as it affects our city. We would like to take this opportunity to make the following comments:

Montgomery city and county is the only area in the United States in which a complete engineering architectural evaluation of all the buildings in the city and county has been made to determine their suitability to protect the population from radioactive fallout. In our opinion this has turned up surprising information:

(*a*) It was found that virtually no fallout protection whatever existed outside the city limits.

(*b*) 80 percent of the suitable shelter spaces are located in the downtown area of the city, and the remaining 20 percent are within the city limits.

(*c*) That the city's existing structures have spaces for 200,000 people, affording a protection factor of at least ten. These spaces are more than the population of the city and county.

(*d*) That the city's existing structures have spaces for 500,000 people, affording a protection factor of at least five. These spaces are more than three times the population of the city and county.

(*e*) It was found that the relationship of population to shelter was 145,000 city residents to 30,000 rural residents. The relationship of the population in distance to the nearest available shelter is:

Twenty-four percent of the city population live within one-half mile of their shelter.

Forty-one percent of the city population live within 1 mile of their shelter.

Eighty percent of the city population live within 2½ miles of their shelter.

Ninety-eight percent of the city population live within 4 miles of their shelter.

Twenty-three percent of the rural population live within 5 miles of their shelter.

Sixty-four percent of the rural population live within 15 miles of their shelter.

Ninety-nine percent of the rural population live within 30 miles of their shelter.

It is believed that the above relationship will be applicable to a large part of the United States. We feel that one factor will enter into the number of shelter spaces available. The fact that Montgomery is the capital of the State and as a result has a higher number of heavy masonry type buildings than would normally be expected in a city of 145,000 population in this section of the country. In many areas of the country caves, mines, homes and buildings with basements and other such structures would more than offset this factor. As an example, Birmingham, Ala., with its many mines, is an exception within our own State.

We feel that in evaluating shelters for radioactive fallout protection that it is necessary to consider the closeness of the shelter to the probable ground zero point of a nuclear explosion, whether it be an H-bomb or an accident involving a nuclear reactor. In the event of war it is believed that all SAC bases would be a prime target and any structure near such prime targets, although outside of the blast area, would of necessity require a tremendously higher protection factor than a shelter located 100 miles or more from the site of the blast.

One of the most important phases of the radioactive fallout shelter program should be an inventory by each city of its best existing structures to serve as radioactive fallout shelters. This survey can be made by a trained crew from an automobile and would not require an engineering analysis of the structures. The whole purpose of the survey would be to designate the most suitable structures within a city to protect the population from radioactive fallout. Whether the protection factor afforded would be sufficient to protect sufficiently would depend upon the distance from ground zero of the nuclear explosion. The stressing of the construction of home shelters should be vigorously pushed.

It is strongly believed that the single most important factor in affording civil defense in any form is the acceptance on the part of the local governing bodies of the city, county and State, that they and they alone are responsible for the protection of their citizens. Unless these political subdivisions genuinely wish to provide the protection to their populations it will be impossible to accomplish it. These units of government must be made aware of the fact that it is they and they alone to whom the population will look to and expect to be provided for in the event of disaster. The governing bodies of a city, county or State should

accept the responsibility of disaster control, which civil defense is, the same as it accepts responsibility for police, fire and health protection. Then and then only will adequate civil defense be provided.

The cost of accepting and putting into effect such a civil defense or disaster control program would be exceedingly normal to the city, county or State. Within our city-county we have found that the prime responsibility to provide this protection rests on our police, fire, waterworks, utility companies and medical profession. A radioactive fallout shelter program basically is nothing more than the continued operation of a city under adverse conditions. Utilities must function, police and fire protection must be provided, and the only change in the problem is that radioactivity must be reckoned with, which can be done when performed a reasonable distance from the site of a nuclear explosion.

I would say from this letter, that as a result of the survey down there, they have adopted completely the so-called local responsibility, the do-it-yourself philosophy, as a result undoubtedly of their contracts with you.

The first part of the letter, in answer to the specific questions, where they state three civil defense home shelters have been constructed in their city, no public buildings have been modified, they do not have an underground control center and underground shelter having to do with civil defense purposes, and no fallout protection in the form of structural modifications incorporated in any of their public schools, shows a complete failure to put their convictions into practice.

Mr. HOEGH. I know this man, Mr. Chairman. Who signed the letter?

Mr. HOLIFIELD. Price C. McLemore, director of the Montgomery city-county civil defense headquarters.

Mr. HOEGH. Of course, in his letter, Mr. Chairman, he stated there were spaces for protection for 80 percent of the population.

Mr. HOLIFIELD. Eighty percent of the suitable shelter spaces are located in the downtown areas.

Mr. HOEGH. Some of those do not have the protection factor that they should have, but, as I mentioned here, they have a great number. I do know they are going to be implemented by modifications. That has not yet been done. I know it is a matter of getting funds and going ahead with it.

Mr. HOLIFIELD. At least they are aware of the problem down there as a result of your survey.

Mr. HOEGH. Yes, sir. I am convinced that these surveys are of real good service to people and governments, and I think they will serve as a good stimulant.

Mr. HOLIFIELD. I think they have to be done. I am in agreement with you that surveys of all existing shelter potentials have to be done.

I am possibly not in agreement with your hopes as to the results that will be obtained and the results of the surveys. I think that is the beginning, certainly, to know what you have and how to adapt yourself.

The proof of the pudding, of course, will be in the actual implementation of the information gotten from the surveys.

Mr. HOEGH. I hope our request of $1,500,000 for continuing this type of work, the surveying of existing structures, will be approved by the Congress this year.

As I pointed out, last year we made the request for $2 million, and they reduced that to $500,000.

I think this should be properly financed by the Federal Government to go ahead and make this sampling survey.

Mr. HOLIFIELD. In cases like those in the city of Montgomery, where it is the capital of a State and where they have considerable masonry structures, I suppose the commonsense solution there would be the modification and improvement of those structures rather than depending on evacuation?

Mr. HOEGH. Yes, sir.

Mr. RIEHLMAN. If the full request for $1,500,000 is granted, how many cities or areas would that include in your survey?

Mr. HOEGH. We try to make one in each of the other States. In other words, we have been in eight States up to this point.

Mr. RIEHLMAN. Would $1,500,000 permit a survey in each of the other States?

Mr. HOEGH. It would cover enough to get most of the other States. We might have to have one between two States, but generally speaking——

Mr. RIEHLMAN. That would include one large city in each State; is that correct?

Mr. HOEGH. Not necessarily a large city in each instance. You know, when you make a survey of several large cities, as we have had in Milwaukee, we propose in New York City and Los Angeles, and we have had in Montgomery, Ala., you are getting a pretty good idea of what to do in larger areas.

We might have to make one or two more, but I think we can then spread it out into cities of more normal size.

Mr. HOLIFIELD. Proceed.

POINT 3—RESEARCH

Mr. HOEGH. The third point of the national policy on shelters is that "the Administration will accelerate research in order to show how fallout shelters may be incorporated in existing, as well as in new, buildings—whether in homes, other private buildings, or governmental structures. Designs of shelters will be perfected to assure the most economic and effective types."

The acceleration of research has proceeded effectively because OCDM has available leading American scientists in the field of gamma radiation shielding and because earlier research has provided a sound foundation. Among the organizations which have significantly contributed to the success of this research are the National Academy of Sciences, National Bureau of Standards, Naval Radiological Defense Laboratory, Oak Ridge National Laboratory, Defense Atomic Support Agency, Atomic Energy Commission, et al.

OCDM research has not been limited to the publication of scientific reports, but rather has been quickly developed into design and evaluation procedures which can be readily used by architects and engineers to reduce the cost and increase the efficiency of fallout shelters.

Guides and manuals: Basic to the entire fallout shelter program are three publications developed from our comprehensive research program on radiation shielding. Each publication has been carefully reviewed by the shielding subcommittee of the National Academy of Sciences.

To provide guidance for architects and engineers who are evaluating existing buildings, modifying existing buildings to increase their

worth as shelter and preparing preliminary designs for incorporating shelter into new buildings, OCDM has produced a "Guide for Architects and Engineers." This publication presents streamlined methods of shielding analysis which enable the professional user to analyze a shelter area with reasonable accuracy in less than an hour. Minimum habitability standards for fallout shelters are included.

Once it has been ascertained that fallout shelters can be economically incorporated in a given building, detailed designs must be completed. Thus, in addition to the Guide, a detailed engineering manual is needed to insure that the final design reflects the most efficient incorporation of protection into the building. The OCDM engineering manual, "Design and Review of Structures for Protection from Fallout Gamma Radiation" was designed to fill just such a need. When compared with designs based on previous criteria, application of this manual to specific projects has, in the past 2 years, reduced shelter construction cost estimates by hundreds of thousands of dollars.

These two OCDM publications are used not only by our own staff and by private firms of architects and engineers, but also are being incorporated into publications used by the armed services, the Rockefeller Committee, and several foreign governments.

The fundamental scientific work upon which the engineering procedures are based is "Shielding Against Radiation From Nuclear Weapons." This scientific monograph was prepared by Dr. Lewis V. Spencer who is chairman of the National Academy of Sciences' committee on shielding mentioned earlier. This publication is widely used in scientific circles to plan future shielding experiments in the development of new analytical techniques which may well result in further design economies.

Other publications of value in this field are the immediate result of our research effort.

Design development.—Using the most recently developed procedures and criteria, detailed plans have been completed for a wide variety of shelters. From these studies, cost estimates, definitive designs and guidance for future research have been obtained. Among the design situations studied were schools, hospitals, apartment and office buildings, utility plants, garages, residences, and so forth.

Since schools are recognized as desirable sites for fallout shelters, a comprehensive research study has been completed which developed detailed plans of four types of school shelters. The four typical case studies are based on—

(*a*) The incorporation of a basement shelter into a new school;

(*b*) The incorporation of a ground floor shelter into a new school;

(*c*) The addition of a four-classroom underground shelter to an existing school;

(*d*) The addition of a partially underground multi-purpose room to an existing school.

Schools can become one of our most useful shelter resources. In addition to the valuable information gained from these studies, there is now available an OCDM publication "School Shelter—An Approach to Fallout Protection," and detailed plans, specifications and cost estimates for the case studies developed.

The preservation of medical services is vital to civil defense. It is imperative that adequate attention be devoted to the incorporation of fallout shelters in hospitals and other medical structures. To this end, detailed research is underway on a typical 150-bed general hospital. This size hospital normally serves a community of 15,000 to 25,000 people. In this case, the basement and ground floor area of the clinical services wing have been economically developed as shelters without interfering with the normal routine of the hospital.

Also of critical importance to civil defense are such vital public utilities as electrical-generating plants, waterworks, sewage treatment plants, and other public utilities. Since these utilities have distinct features, it is necessary to give them special attention. Therefore, preparation of definitive plans for the incorporation of fallout shelters in these types of buildings is the subject of a special research contract.

The usefulness of underground parking garages for shelter purposes is easily recognized. However, it was necessary to institute detailed research so that this type of shelter resource could be utilized most efficiently and at least cost. For this purpose a 750-car underground parking garage was selected. Starting with a standard design, a fallout shelter for over 10,000 persons has been developed.

A wide variety of home-type shelter designs have been developed by OCDM, several trade associations and organizations such as the Rockefeller Committee on Fallout Shelter. Designs are now available that use concrete, brick, block, steel, wood, and other materials. Private organizations have enthusiastically embarked upon their own home-shelter design programs and OCDM research now confines itself to technical guidance.

Other OCDM research design development projects include the incorporation of shelters into apartments and office buildings, industrial plants and subways and the development of separate underground group shelters ranging from 25 to over 5,000 persons. Of special interest to the committee may be the 100-person shelter which has been designed, constructed and tested for OCDM by the Naval Radiological Defense Laboratory.

Research surveys.—A series of four comprehensive research studies have been completed to assess the fallout shelter potential of different types of communities in varying geographical situations. The specific results of a given survey includes the protection category of existing structures, the capacity of these areas (by categories) and an estimate of the cost of improvment to higher categories. Since this research has been presented under point 2 of the national shelter policy, it will not be discussed further.

Environmental research.—The provision of normal comfort standards in group fallout shelters has been found to be expensive. On the other hand, extremely low standards can be dangerous and markedly reduce shelter effectiveness. In order to develop reasonable shelter standards, OCDM research has completed a series of experimental investigations and technical studies.

Utilizing the broad engineering experience of the National Bureau of Standards, a detailed study was completed to determine the habitability characteristics of the basic OCDM underground family shelter. Through the use of mechanical devices to stimulate long-term human occupancy, variations in outside weather conditions, soil temperature,

ventilating rates, etc., were carefully studied. Information derived from these studies has been directly incorporated into the guides and manuals mentioned earlier.

The Naval Radiological Defense Laboratory has long been recognized as an outstanding test facility. It was, therefore, only logical for OCDM to ask them to perform a comprehensive series of full scale environmental engineering studies on the 100-man underground metal arch shelter. Using volunteer personnel, the shelter was continuously occupied for 14 days under buttoned-up conditions. Approximately 12 square feet of gross area was available to each occupant and, in general, this seems to have been a reasonable survival standard.

Further work is being done to supplement this test by others involving men, women, and children. These additional studies are underway to provide information on the sociological and psychological aspects of shelter habitability for mixed groups. This test series is being conducted in the Pittsburgh area and should be completed this summer.

An occupancy test using a volunteer family of five has also been conducted. This test clearly demonstrated that a typical American family could live in an OCDM family fallout shelter for 2 weeks with no mental or physical ill effects.

In order to insure that OCDM fallout shelter standards and criteria are flexible enough to account for the wide variations in climatological, geological, and other conditions in the United States, further environmental engineering research has started. Using shelters constructed under the prototype program, OCDM research contractors will carefully study and test selected shelters and from this information, supplemented by earlier experience, a standard shelter code suitable for incorporation into local building codes will be produced.

Special research activities.—A vast reservoir of research information directly applicable to the fallout shelter program is to be found in many organizations outside OCDM. To take full advantage of this data, OCDM research has an active technical liaison program which not only maintains close contact with U.S. governmental agencies, but also with scientific and engineering personnel in Canada, Great Britain, Germany, Switzerland, Sweden, et al. It would be difficult to estimate in terms of money the value of this liaison effort, but it would be conservative to state that the OCDM research budget would have to be increased many times without it.

OCDM research has not relied solely on publications to bring important technical information to the attention of the professions. In cooperation with other OCDM offices, lectures and courses on the latest research data have been presented to technical staffs of (1) Federal and State agencies (2) armed services (3) industrial firms and (4) architectural and engineering firms.

POINT 4—PROTOTYPES

The fourth point of the national shelter policy is this:

The Administration will construct a limited number of prototype shelters of various kinds, suitable to different geographical and climatic areas. These will be tested by actual occupancy by differing numbers of people for realistic

periods of time. They will also have practical peacetime uses. Some of the prototype structures will be incorporated in—

(*a*) Underground parking garages.
(*b*) Understreet shelters.
(*c*) Subways.
(*d*) The Federal highway program—patrol and maintenance facilities.
(*e*) Additions to existing schools and new schools, including such facilities as cafeteria, assembly space, and classrooms.
(*f*) Additions to existing hospitals and new hospitals, including such facilities as cafeterias, visitors' and convalescent rooms, and reserve areas.
(*g*) Industrial plants.
(*h*) Commercial buildings.
(*i*) Family residences and apartments, including such facilities as bathrooms, garages, basements, and recreation rooms.

The Congress appropriated $2,500,000 for fiscal year 1960 to start the prototype shelter program. The report of the House Committee on Appropriations that accompanied the independent offices appropriation bill states:

> The bill provides $3,500,000 for research and development, including $2,500,000 for construction of prototype shelters for demonstration purposes. The funds allowed are for the first year costs of a 2-year program.

Since the purpose of the program is to construct a limited number of fallout shelters of various kinds for demonstration and test purposes, project locations were selected in different geographical and climatic areas, and where they could be seen by large numbers of people.

One family shelter was allocated to each regional office for regional headquarters' demonstration purposes; one or more to each State, the District of Columbia, and the Commonwealth of Puerto Rico. Most of them will be completed by June 1960.

We are constructing five 100-man and thirty-seven 50-man community shelters. Some of them include remodeling existing structures to provide fallout shelters.

There are 11 major group shelter projects:
Two school additions, Tulsa, Okla., and Chicago, Ill.
One new school, Hartford, Conn.
Two hospitals, Livingston, N.J., and San Antonio, Tex.
One highway fill shelter, Seattle, Wash.
One museum, Milwaukee, Wis.
One community center, Boise, Idaho.
One underground garage, Colorado Springs, Colo.
One understreet shelter, city not determined.
One dome-type shelter, Miami, Fla.
One apartment house shelter, city not determined.
One industrial shelter, city not determined.

I'll describe each of these projects briefly:

Nathan Hale High School, Tulsa, Okla.—This shelter will be constructed by completing the excavation in a partially excavated portion of the basement. When completed it will provide space for four classrooms for the school as well as fallout shelter for the school population. The Government will construct the entire shelter as an addition to the existing school at an estimated cost of $65,000. The shelter will include emergency equipment such as ventilation, power and water supplies. It will be furnished so as to permit occupancy for a period of 14 days.

During the term of our agreement with the city of Tulsa, the Government will have the right to conduct research in the shelter for two periods of 20 days each during each year of the agreement. The shelter will be open daily for public view as well as during specific nighttime periods.

Chicago.—The prototype shelter within an elementary school will include excavating a partially excavated basement as well as utilizing already existing basement space. The basement contains a cafeteria, and service area for the school. The newly excavated portion will be used as an indoor recreation area for the students. Equipment for the shelter will include necessary ventilation, emergency power, sanitation and water facilities and will be furnished by the city to permit emergency occupancy by the school population of 600 for a period of 14 days. The additional cost of the shelter is estimated to be approximately $50,000.

Research will be conducted for two periods of 20 days each during each year of the agreement. Public viewing will be at regularly scheduled periods each week at which time a local civil defense representative will be present to serve as a guide and to provide shelter information.

Hartford, Conn., public high school.—The entire basement of the Hartford Public High School will be constructed so as to provide fallout protection for the 2,500 students. The basement area will include recreation areas for the students, student cafeteria, faculty cafeteria, and the service elements for the operation of the high school. Although it was originally planned to build only a prototype shelter in a portion of the basement, the board of education and the city of Hartford wanted to make the entire basement a shelter area. The participation by the Federal Government is based on our original cost estimate for shelter in a portion of the basement.

The cost of adding shelter in the entire basement is in excess of $250,000. The Government participation will be on the basis of the additional shelter cost not to exceed $125,000. The shelter will be open for public viewing daily during the first 2 years after dedication and thereafter two to three times a week at regularly scheduled and publicized times. The city civil defense department will provide a representative to be present at all times when it is open to the public. In addition, special tours may be arranged by the school, local authorities, or OCDM.

St. Barnabas Medical Center, Livingston, N.J.—The proposed St. Barnabas Medical Center will have two floors underground which will contain the operating facilities of the hospital and the area for postoperative care. An additional area will be built above ground for convalescent patients and for other patients not seriously ill. The two underground floors of the proposed medical center will be constructed so as to provide protection againt fallout and to permit operation of the hospital under emergency conditions without depending upon any outside service. To provide for this type of emergency operation, special protective shielding is required in the structure as well as self-contained ventilation, air conditioning, emergency power, and emergency water supply.

The protected area in the two basement floors will include kitchen facilities and will be complete with sufficient emergency supplies

stored in the area to permit occupancy for a period of 14 days. The additional cost to St. Barnabas of including the protective structure and emergency equipment necessary to provide fallout protection and shelter occupancy is in excess of $450,000. Government participation will be on the basis of the additional shelter cost not to exceed a total of $400,000. The Government will be authorized to conduct research projects in the shelter for two periods of 20 days each during each year of the agreement. The officials of the hospital will conduct guided tours for the public at regularly scheduled times to be publicized locally. In addition, special private viewings may be arranged by the hospital, local civil defense, or by OCDM.

Southwest Texas Methodist Hospital, San Antonio, Tex.—This is practically the same as the St. Barnabas Medical Center except that the underground facility will not contain as many bed spaces for hospital patients. It will consist primarily of operating rooms, pathology facilities, and clinics necessary to the operation of the hospital.

During an emergency it is planned to move the patients who will normally be housed above ground into the two subterranean floors where they can be housed under emergency conditions for a period of 14 days or more. Government participation is based on the additional cost of shelter not to exceed a total of $400,000 (in all cases the additional cost of shelters is the differenec between the cost of the building without the protective structure and emergency equipment and the cost of the building with protective structure and emergency equipment).

Terms of the agreement are the same as at St. Barnabas.

Although planned to accommodate the hospital population of approximately 1,000 people, shelter space will be available for some 1,500 to 2,000 additional persons.

Highway fill shelter, Seattle, Wash.—A highway fill shelter will be built in the Ravenna overpass which is part of a new freeway system being built through the city of Seattle. This will be a concrete base structure mounded over with the earth supporting the overpass and will accommodate approximately 250 persons. The structure will be used normally as a station for the Washington State Highway Patrol as well as a testing and issuing station for drivers' licenses. The cost of this structure is currently estimated at $65,000. The city of Seattle will equip the shelter so as to provide emergency food, bedding, and other supplies for 250 people for a period of 14 days. Necessary ventilation, sanitation, power, and water supplies will be included as part of the basic structure.

The overpass is part of the Federal-aid Highway System and is being constructed by the State highway department. Both the State highway department and the regional office of the Bureau of Public Roads are cooperating in the construction of the shelter.

Museum, Milwaukee, Wis.—In this project, an additional area will be excavated in the subbasement which will provide shelter space for approximately 2,000 people. Radiation protection for this area will be provided by structural changes such as baffle walls and overhead shielding. The kitchen facilities and sanitation facilities located in the subterranean area will service the shelter area.

The additional shelter area will cost approximately $250,000 of which the Federal Government will reimburse the owner for the additional shelter cost not to exceed $200,000. The additional cost will be borne by the city of Milwaukee. The shelter area will also be devoted to a permanent shelter display. This display will be open for public viewing during the times the museum is normally open to the public and special tours may be arranged. The Government will have the right to use for research purposes this shelter area for two periods of 20 days each for each year of the agreement.

An interesting point of this shelter is that all the schoolchildren in the Milwaukee metropolitan area visit the Museum at least once each year as part of their activities.

Community Center, Boise, Idaho.—A community shelter in a housing development in suburban Boise will be an underground shelter designed to provide shelter for 100 families. The owner of the shelter will be a corporation known as the Highland Hills Association, members of which are families owning homes in the area. The structure is centrally located and will serve the dual purpose of a meeting area for PTA, Boy Scouts, and other similar organizations. The total cost of this structure is estimated to be approximately $85,000 of which the Federal Government would pay $60,000 for the construction of the basic underground shelter. The Highland Hills Association will equip and furnish this basic structure as a shelter.

Underground garage, Colorado Springs, Colo.—This project is in the subbasement of the proposed Continental Hotel-Motel to be constructed in Colorado Springs, Colo. The shelter will be in an underground garage which is to be built as part of the hotel structure. Shelter requirements will include some additional structural shielding as well as providing ventilation equipment, emergency power, and emergency water supplies. It will be a public shelter.

Government participation will be on the basis of reimbursing the owner for the additional cost of including shelter provisions in the underground garage not to exceed $200,000. The shelter will be open to the public on specified days each week at which time the city civil defense department will provide a representative to explain the shelter provisions and to serve as a guide.

Understreet shelter.—The original plan for an understreet shelter was to use a pedestrian tunnel in the new State office building in Indianapolis, Ind. When this project was discussed with the Governor he decided that the State of Indiana would build a shelter at a cost of approximately $60,000 at its own expense. The pedestrian tunnels and underground areas of this office building should provide shelter for at least 5,000 people.

Dome-type shelter, Miami, Fla.—We have three sites within Dade County upon which we may build a dome structure. The final proposal for one of these sites is now being developed within Dade County with the county to provide the land upon which the shelter is to be built. The county will also provide necessary furnishings, maintenance, public demonstration, and dual use. We have programed this at a cost of $50,000.

A typical community shelter is a basement area of an existing building which can provide radiation protection of 100 or more without major structural change although it may be necessary to close basement windows or erect baffle walls around stairways and elevators.

The typical community shelter has a dual purpose. It is converted to shelter by the addition of an emergency power source, water supplies, ventilation, temperature control, etc. Furnishings are provided by the owner or the city and are sufficient to permit occupancy for a period of 14 days for the number of persons the shelter will accommodate. Although planned for 50 people, the typical shelter could accommodate from 75 to 100 people at a cost not to exceed $10,000. Proposals we are now negotiating include sports arenas, office buildings, schools, youth buildings, at fairgrounds, juvenile halls, churches, fire stations, city municipal buildings, and so forth.

These sites have been approved:

Washington, D.C.: VFW national headquarters.
Washington, D.C.: American Legion headquarters.
Pittsburgh, Pa.: State office building.
Norfolk, Va.: New construction, Lafayette Park.
Charleston, W. Va.: City hall.
Montgomery, Ala.: School.
Memphis, Tenn.: Commercial office builidng.
New Orleans, La.: City hall.
Topeka, Kans.: Youth Building.
Des Moines, Iowa: Auditorium.
Kansas City, Mo.: Public library.
St. Louis, Mo.: Sports arena.
San Francisco, Calif.: Youth guidance center.
Martinez, Calif.: Juvenile detention home.
Salt Lake City, Utah: Public utilities company building.

Mr. HOLIFIELD. Is the dome type shelter necessary because of the underground water seepage?

Mr. HOEGH. Yes, that is true of many we will construct in other places along the southern border.

Mr. HOLIFIELD. Where the water table is close to the surface?

Mr. HOEGH. Yes, it will be expensive to eliminate the water seepage. You need pump systems and whatnot. Above ground you can do it more reasonably.

Mr. HOLIFIELD. I notice in the cemeteries down there they bury their people above ground, I suppose for the same reason?

Mr. HOEGH. That is my understanding as to New Orleans, yes, sir.

Projected program, 1961.—The 1961 budget estimates program $3 million for prototype shelter construction. These funds are required in order to permit shelter construction in areas not covered by the 1960 program. In addition, shelters of different types and materials will be designed and constructed. Finally, it is proposed that a portion of the 1961 funds be reserved to provide design services as an incentive to the State and local governments, commerce, industry, and private individuals who are planning shelter construction with their own funds.

Prototype displays.—In addition to the actual shelters constructed under the prototype program, we have developed a number of prototype displays which have been seen by thousands of persons at State and county fairs. We have erected these structures at the Detroit, Mich., State Fair; the Pueblo, Colo., State Fair; at Ithaca, Mich., in Gratiot County; at the Springfield, Ill., State Fair; the Indianapolis, Ind., State Fair; the Los Angeles County Fair at Pomona, Calif.; and at Albuquerque, N. Mex.

These structures generally are models of basement shelters and have been made from a variety of products, including preshaped metal, wood, and concrete block. Some are also above ground and not all subbasement.

The prototype shelters, when completed, will serve as examples for others to follow and should stimulate construction of fallout shelters by governments, industries, and people.

POINT 5—NEW FEDERAL BUILDINGS

Point 5 of the national policy on shelters states that—

> The administration will provide leadership and example by incorporating fallout shelters in appropriate new Federal buildings hereafter designed for civilian use.

Following the announcement of the shelter policy, the Office of Civil and Defense Mobilization and the Bureau of the Budget jointly formulated a program for the incorporation of fallout shelter in new Federal buildings. On September 29, 1958, a directive was issued by OCDM to the heads of all non-military Federal departments and agencies effectuating the program and furnishing governing standards and criteria.

In this paper I stated:

> All Federal departments and agencies are directed to include in their budget estimates for new Federal buildings for fiscal year 1960 and subsequent years the additional sums of money required for the incorporation of fallout shelter in such buildings. The intent of the policy is that fallout shelter be incorporated in all new nonmilitary Federal buildings that are reasonably adaptable for the purpose.
>
> A Federal building, for the purpose of this directive, is defined as a building constructed by the Federal Government or by private enterprise specifically for lease to the Federal Government. Obviously, such structures as gatehouses and small power switching stations, where there are few if any people permanently stationed, should not be included. However, the fact that a building is small (for example a 2,000-square-foot post office) does not mean that it may not be a highly desirable shelter location and full advantage should be taken of such a structure.
>
> Fallout shelter should be incorporated regardless of the proximity of the building to dense populations. Should a department or agency question the propriety of including shelter in a proposed new building, other than minor structures of the types previously mentioned, that department or agency shall submit a statement to the Director, Office of Civil and Defense Mobilization, explaining fully the basis for the questions. Thereupon OCDM will either determine that shelter is desirable for inclusion and outline the manner in which it may be provided, or concur in its omission.
>
> The Federal departments and agencies having responsibility for the design of Federal buildings shall be responsible for the design of fallout shelters in such buildings, in accordance with the established criteria. OCDM will be available for consultation when such services are required.

During the latter part of 1958 and the early part of 1959, conferences were held with the principal construction agencies to discuss application of the standards and criteria and additional study was given to the requirements for incorporating shelter into new buildings. As a result of these conferences and study a revised directive was issued on February 4, 1959, further explaining the standards and criteria.

Fiscal year 1960 budget requests.—Request for funds specifically for fallout shelter was included for only one project in the fiscal year

1960 budget estimates. This project was an addition to a laboratory building at the Boulder, Colo., laboratories of the National Bureau of Standards, Department of Commerce. Congress subsequently appropriated funds for the construction of this Laboratory addition, including $90,000 for the incorporation of fallout shelter.

An architectural firm has made preliminary plans for the Laboratory addition which includes provision for fallout shelter to accommodate approximately 700 persons. This shelter will provide protection under fallout conditions.

While the fiscal year 1960 budget estimates contained only one specific request for funds for fallout shelter, subsequent negotiations have resulted in the development of plans for incorporating fallout shelter into several projects for which funds were appropriated prior to, or in, fiscal year 1960. These projects are:

(*a*) Veterans Administration: Addition to hospital, Houston, Tex. This proposed addition is particularly suited for the inclusion of fallout shelter and preliminary plans have been completed. The shelter in this addition will be financed from general construction funds which were appropriated in fiscal year 1960.

(*b*) Federal Aviation Agency: Dulles International Airport, Chantilly, Va. Plans are being made to include fallout shelter in a portion of the new proposed terminal building. General construction funds for this project have been appropriated.

(*c*) National Aeronautics and Space Administration: Goddard Space Flight Center, Greenbelt, Md. Shelter is being incorporated into one of the buildings now under construction.

(*d*) Department of Labor: A building to house the District of Columbia Unemployment Insurance and Employment Services activities is being designed by the General Services Administration. Preliminary designs include provision for fallout shelter. Funds for buildings for this Service are not obtained by direct appropriation.

(*e*) Federal Deposit Insurance Corporation: The General Services Administration is preparing preliminary designs for a building in Washington, D.C., for this Corporation. These preliminary designs will include provision for fallout shelter. Funding is not by direct appropriation.

Fiscal year 1961 budget requests.—On June 22, 1959, a call was issued to all appropriate Federal agencies to inform the Office of Civil and Defense Mobilization of their fiscal year 1961 plans for new building construction or design for which shelter funds were to be included in the budget estimates.

The data furnished was to include—

(1) Buildings considered to be unsuitable for the inclusion of fallout shelter, with the reasons therefor in each case; and

(2) Buildings considered to be suitable for the inclusion of fallout shelter, together with estimates of cost for the construction or design or both.

The Bureau of the Budget, in anticipation of the fiscal year 1961 budget requests, issued a circular of "Instructions for the Preparation and Submission of Annual Budget Estimates." These instructions included the following statement:

Estimates for design and construction of Federal buildings must include amounts required for incorporation of fallout shelter in accordance with policies announced by the Office of Civil and Defense Mobilization.

The fiscal year 1961 budget estimates, as submitted to Congress, include approximately $11,500,000 for the inclusion of fallout shelter in proposed new building design and construction. These estimates have been submitted by the following agencies:

(*a*) General Services Administration: This agency has not yet submitted its list of specific projects which will include fallout shelter. It has, however, indicated that approximately 5 percent of its total budget of $185 million will be used for the purpose.

(*b*) Veterans' Administration: Budget estimates include $1,265,000 for the inclusion of fallout shelter in new construction planned for hospitals located in Cleveland, Ohio, Washington, D.C., and San Francisco, Calif.

(*c*) National Aeronautics and Space Administration: Budget estimates include $357,000 for the incorporation of fallout shelter in buildings to be located at Goddard Space Flight Center, Greenbelt, Md.; Emergency Conversion Laboratory, Cleveland, Ohio, and Basic Materials Research, Cleveland, Ohio.

(*d*) Department of Commerce-National Bureau of Standards: This agency has included $375,000 in its budget estimates for the inclusion of fallout shelter in the Radiation Physics Building, Gaithersburg, Md.

In addition to the amounts which have been requested for the inclusion of fallout shelter in the budget estimates of the agencies noted above, the Department of Health, Education, and Welfare and the Post Office Department have requested funds for new building design or construction. At this time, the plans for the proposed new construction or design have not progressed to the point where the feasibility of including fallout shelter can be determined. Shelter will be included where the buildings, as planned, are appropriate for the purpose.

The Federal Reserve System does not obtain funds for building construction by direct appropriation. However, the Board of Governors has indicated a desire to comply with the provisions of the national policy on shelters and has provided guidance and information to the 12 Federal Reserve banks.

This program of Federal Government leadership and example is most important to stimulate other governments, industries and people to take action.

We hope again that our requests for those funds are approved.

POINT 6—EXISTING FEDERAL BUILDINGS

The final point in the national policy on shelters provides that—

The Administration will provide leadership and example by incorporating fallout shelter in appropriate existing Federal buildings now used for civilian purposes.

Shortly after announcement of the shelter policy, OCDM asked the General Services Administration to conduct a research project on the feasibility of incorporating fallout shelter in existing Federal buildings. The GSA was directed that, "If feasible, the shelter should be designed to accommodate normal day-to-day operations of such a nature that all unnecessary furniture, equipment and materials can be readily removed in the event of an emergency, thereby

making the shelter ready for occupancy." Detailed studies were made on 10 Federal buildings which were selected to provide a wide range of size, use, and construction. The GSA study developed the following major conclusions:

(1) Some fallout shelter fulfilling the qualifications of category A can be developed in most Government buildings having basements.

(2) About half of the buildings studied did not have enough space that could be developed for shelter in their basements to accommodate the normal building population.

The GSA included in its fiscal 1960 budget estimates an item of $2 million to start the program for building fallout shelters into existing Federal buildings. This money was to have been used for the construction of shelters in approximately 25 buildings throughout the country. It was anticipated that this program would be coordinated with, and be a supplement to, the prototype shelter program. The Congress denied any funds for this purpose.

Funds in the amount of $2 million are again contained in the budget request of GSA for fiscal 1961. This item is now pending before the Congress.

The Federal Reserve System is conducting a survey to determine the cost and feasibility of incorporating fallout shelter into its existing facilities. Although this agency does not obtain funds by direct appropriation, it plans to cooperate fully in furtherance of the program.

Again, it is urgent that Congress provide the funds requested by the President to put into effect this vital Federal leadership and example program.

POINT 7—NEW YORK ACHIEVEMENTS, ROCKEFELLER

Governor Rockefeller, this past week, recommended a fallout shelter program to the New York Legislature. The proposed legislation, a first step toward achieving the general objectives of the McHugh report does the following things:

(1) Directs the New York State Civil Defense Commission to establish standards for shelters as to materials, areas and other details;

(2) Directs the commission to build 300 demonstration shelters distributed throughout the State and to take all other possible steps to encourage voluntary construction in homes;

(3) Directs preparation of detailed plans and drawings for fallout shelters in all State buildings, including schools;

(4) Directs preparation of plans in detail for an alternate emergency seat of government;

(5) Directs all counties and cities to make plans for continuing their governments in case of attack;

(6) Requires the Civil Defense Commission to report back to the 1961 legislature on all necessary additional steps needed to achieve objective, including proposals for any mandatory program then indicated;

(7) Amends the education act to authorize elementary and high schools to conduct courses on radioactive fallout and effects of nuclear attack;

(8) Amends tax laws to allow State income tax deductions and exemption from real property tax, immediately effective from the year in which constructed and pro-rated over a 5-year period;

(9) Includes appropriations amounting to $950,000, for preparation of plans and drawings indicated above and $1,475,000 for an expanded State CD organization for intensified public information and a program involving demonstration shelters.

I would like to summarize the steps in the development of this significant program. It demonstrates what can be accomplished at the State level.

Since 1956, we have been working with the Civil Defense Committee of the Governors' Conference, first under the chairmanship of Governor Harriman and more recently under the chairmanship of Governor Rockefeller. I was a member of this committee while Governor of Iowa. In addition to Governor Rockefeller as chairman, the committee consists of the Governors of California, Michigan, South Carolina, and Utah. Governor Boggs of Delaware, Chairman of the Governors' Conference and a member of our National Advisory Council, has participated in the meetings of the civil defense committee.

Following my appearance at the Governors' Conference in 1958, and as a result of the report of its civil defense committee, the Governors' Conference unanimously approved the national shelter policy on May 21, 1958.

Early in 1959, Governor Rockefeller was appointed chairman of the Governors' civil defense committee. Immediately after his appointment I met with Governor Rockefeller and his staff, and, during the following months, we developed a work program for the Governors' conference committee, which was later approved by the national conference.

As you know, Mr. Chairman, Governor Rockefeller, through his chairmanship of the Rockefeller Bros. studies on problems of U.S. defense, and through his service as an executive in the Federal Government, is familiar with the nuclear threat and civil defense problems.

Because of his very great interest and concern—as more recently indicated by his exchange of correspondence with you—Governor Rockefeller appointed the special task force on protection from radioactive fallout, chaired by Oscar M. Ruebhausen. No doubt you are familiar with the July 6, 1959, report of this task force.

The report concluded as follows:

> A successful fallout protection program can give assurance of survival to millions who might otherwise die or be seriously crippled from radiation sickness. It can instill in all our people a confidence that, while nuclear war need not come, if it is brought to our continent by an attacking enemy, we will respond with vigor and success. It will provide abundant notice of our purpose to achieve peace by assuring survival for our people and for the free democratic institutions we cherish.

The task force report was referred to the Committee on Fallout Protection with Keith S. McHugh, former president of the New York Telephone Co., as chairman. This committee developed a comprehensive shelter plan consistent with the national shelter policy.

As a result of our joint efforts, including that of the Ruebhausen group, and after a meeting of the Governors' civil defense committee,

Governor Rockefeller presented the committee's report to the 1959 Governors' Conference meeting at San Juan, Puerto Rico, in August, 1959. The Governors' Conference adopted the report and resolved that—

(1) Each State initiate a vigorous and continuing campaign of education as to the nature of fallout, the extent of the danger, the fact that protection can be achieved, and the crucial importance of affirmative action by individual citizens as a protection against nuclear blackmail and to increase the prospects for peace;

(2) The responsible government officials—Federal, State and local—take immediate steps to assist and encourage the people of this country to prepare themselves successfully to survive radioactive fallout and other aspects of an enemy nuclear attack on the United States, including such matters as adequate warning, shelters, radiation detectors and survival kits; and to that end, an early meeting of the Governors' Conference Committee on Civil Defense be held with the President of the United States, the national military leaders, and other official representatives of the executive and legislative branches of the Federal Government for an intensive review of the nature of the nuclear hazard and the cooperative steps which are available to government—Federal, State and local—for the nuclear protection of our people;

(3) Each State initiate a survey of all State owned or operated facilities to determine both their adequacy as fallout shelters and what steps are needed to provide fallout protection for their users, both regular and transient.

(4) Each State develop a protected seat of State government which will assure the continuance of State government leadership and function during and after a nuclear attack.

This was followed up by the White House Conference on Fallout Protection on January 25 of this year. At this conference, the President met with the Civil Defense Committee of Governors headed by Nelson Rockefeller of New York. The committee also heard statements by the Secretary of State, Christian A. Herter; the Deputy Secretary of Defense, James H. Douglas; the Chairman of the Atomic Energy Commission, John A. McCone; the Under Secretary of Agriculture, True D. Morse; the U.S. Housing Administrator, Norman P. Mason; General Twining, and myself, for the Office of Civil and Defense Mobilization. Statements by the President and his principal security advisors were truly remarkable for their force and their unanimity, and I feel quite certain that the White House Conference on Fallout Protection will prove to be a milestone in convincing the Nation that fallout protection is both essential and feasible.

I should emphasize that neither the Administration, nor the Governor's conference, nor Governor Rockefeller's administration recommended a massive federally financed shelter program. The answer lies in application of the national shelter policy and that proposed by Governor Rockefeller at the State level.

The Governors' committee and I agree that fallout protection is one element of national defense. It could provide the margin necessary for our survival as a nation.

Mr. HOLIFIELD. Governor, this section has been devoted almost completely to Governor Rockefeller's participation.

Mr. HOEGH. That one section, yes, sir.

Mr. HOLIFIELD. I have been very much pleased with the activity of Governor Rockefeller and his recognition of the civil defense problem, starting with the Rockefeller Report before he was elected Governor, and his actions since then. As you probably know, I attended one meeting of the Governors' Conference Committee on Civil Defense, at Chicago. After their meeting in Puerto Rico I had the honor of sitting in and listening to their conference at that time. Governor Rockefeller mentioned his interest in getting this program through the legislature.

I am certainly in favor of the Governor's interest in the program, but like all these voluntary, do-it-yourself programs, despite all of their remarkable and optimistic predictions, sooner or later they come to practically zero.

Under date of March 24 in the New York Times is an article which says:

Rockefeller drops fight to require shelters in homes. New program aid on taxes to anyone who builds refuges voluntarily.

This came about as a result of a meeting which the Governor had on February 24 with members of the New York State Legislature to ask support for all these plans he had. The reaction, according to the report of the New York Times, was negative. Most legislators gave the plan little or no chance of enactment.

In a statement on the floor of the House of Representatives on July 15, 1959, I predicted that there would be no legislative action in the State requiring that shelters be built. There was no mandatory legislation.

(Off the record.)

Mr. HOLIFIELD. On March 23, Governor Rockefeller withdrew his proposal for mandatory shelters before any formal action was taken by the legislature. He did resort to a program embodying voluntary shelter construction with tax relief offered as an inducement. The plan now proposes a resolution asking Congress to provide similar tax benefits on the Federal level, to make shelters mandatory in Federal buildings and other establishments. The new plan requires the State civil defense commission to study the need for a mandatory program on the basis of the year's experience and report its findings to the 1961 State legislature.

Again we resort to the old proposal of studying something, making a research study in place of having a program. It is my prediction that, even with your valiant efforts to try to educate the people on this problem, we shall continue year after year with inadequate shelter for the American people, because people just won't do this job themselves.

Mr. HOEGH. Of course, Mr. Chairman, I am of the opposite opinion. I actually feel that it can be done, but I think we should have the funds that we requested to implement this program. We are doing the best we can with very limited funds.

Mr. HOLIFIELD. I recognize that.

Mr. HOEGH. I still have great confidence that it can be done on this basis. With your leadership and with the leadership of all Federal people speaking out, I think it will have a tremendous impact.

We have critics, you know, who probably do not understand the effects of nuclear weapons. They sort of pooh-pooh the idea, but they do it through misunderstanding. They just do not know the facts.

Mr. HOLIFIELD. Governor, I shall not criticize you in view of the vigorous attempts you have made, at least, to bring the problem to the people. I will not criticize you on that point. I think you have tried to bring the need for shelters against radioactive fallout to the people in the program which you have. I recognize that you are not necessarily the one who makes the basic policy in this field, but have to implement the policy which is made.

Mr. HOEGH. Mr. Chairman, may I go on with my concluding remarks at this time?

Mr. HOLIFIELD. You may.

CONCLUDING REMARKS

Mr. HOEGH. Among these six action measures, I attach primary importance to Federal leadership and example. This is indispensable.

I am glad to be able to tell you about some fairly recent developments which have materially improved the pace and consistency of the Federal Government's leadership effort. Most of these relate to Federal programs which affect the construction industry. Much of the residential or institutional construction in the United States is affected in some degree by Federal programs, and I am convinced that the recent breakthroughs will have a powerful and pervasive effect. My review of Federal leadership will be considered under these headings: (A) Loans and loan-guaranty programs; (B) Grant-in-aid programs.

(A) LOANS AND LOAN-GUARANTY PROGRAMS

1. Home purchase and new construction loans: Until recently, FHA and VA did not recognize the cost of fallout shelters as eligible items in determining valuation for loans or loan insurance. By recent agreement with both FHA and VA, the cost of fallout shelter will henceforth be considered in determining valuation for both loan and loan-guaranty programs.

This decision is being widely publicized, and every effort will be made to use all of the contact points with the public and building community to promote fallout shelter.

The impact of this concerted approach through home-purchase loans and loan-guaranty programs will be significant. FHA processes nearly a million loan applications yearly; it has written more than $50 billion worth of loan insurance. The VA loan-guaranty program has declined in recent years, but its direct loan program (made where private mortgages cannot be obtained on reasonable terms) runs at about $150 million annually.

2. Home-improvement loans: FHA home-improvement loans under title I of the National Housing Act, have long been available for

shelter construction. This is the most practical form of aid which the Government offers for incorporation of shelters in existing structures. With VA, we seek to improve the effectiveness of this program by greater publicity.

Mr. HOLIFIELD. Have you any information at all as to how many applications have been made for home improvement loans for shelter purposes?

Mr. HOEGH. At this time I cannot answer that because we have never asked for such an accounting. I think it would be worthwhile to do that.

3. College housing: The Community Facilities Administration (under HHFA) makes long-term, low-interest loans to colleges for construction of student and faculty housing, cafeterias, student unions, student nurses' and interns' housing, and married students' housing. The program is running at a rate of about $200 million a year.

HHFA and CFA have recently announced that fallout shelter will be an eligible item for inclusion in such facilities, and will encourage colleges to take such action.

4. Public facility loans: Closely related are loans for the development of water, gas, and other public facilities in small communities. By administrative determination, the Community Facilities Administration will encourage the use of such funds for the construction of fallout shelters. The public facility loan program runs at an annual rate of $25 to $30 million, largely in cities under 10,000 population.

5. Project planning advances: Community Facilities Administration also makes interest-free advances for architectural and engineering costs incurred by local governments in planning community facilities.

Until recently, such advances have not been available for planning the incorporation of fallout shelters as part of the overall project. This has been a matter of administrative determination, however—not a matter of law. On December 10, 1959, HHFA and CFA approved the use of project planning advances for inclusion of fallout shelters.

(B) GRANT-IN-AID PROGRAMS

1. Grants for hospital construction (Hill-Burton Act): There is no legal nor administrative barrier to accepting fallout shelter as an optional item in making grants for hospital construction and related health facilities. The Public Health Service has recently given full support to the national shelter policy, and hospital grants will henceforth be available for fallout shelter construction. The availability of grants for inclusion of fallout shelters in hospital construction is regarded as significant—first, because PHS guides and prototype materials are widely used; second, because hospitals are "disaster oriented", therefore receptive to the need for fallout shelter. The program is currently running at an appropriation rate of about $185 million a year as the Federal share (which in individual projects varies from one-third to two-thirds depending upon per capita income in the State).

2. Urban renewal—(*a*) Urban planning grants: The Urban Renewal Administration makes grants for "master planning" by local

authorities. Such grants are currently running at about $2 million annually.

Following agreement with HHFA, steps are being taken now to encourange and promote planning for shelters under this program.

(*b*) Capital grants for acquisition, clearance, and site Development: The Federal Government provides two forms of aid for urban renewal: (1) temporary project financing, and (2) capital grants, which ultimately defray two-thirds of the costs of acquisition, clearance, and redevelopment.

Local authorities provide site improvement such as roadways, sewers, water, and parks in making up their one-third pro rata share. Under HHFA and URA rulings, local redevelopment authorities may build fallout shelters and credit their cost to the local share of the project.

SUMMARY

In summary, Mr. Chairman, I can say that the national shelter policy has met with reasonable success. It has been accepted by most leaders of government at all levels. The extent of public interest, as evidenced by correspondence, by wide press, radio, and television coverage, and by inquiries about shelter plans—all this is encouraging, despite some delay in obtaining appropriations to speed the action elements of the policy.

I am also greatly encouraged by the strong support which I have had from the President, the Secretary of State, and the Chairman of the Joint Chiefs of Staff and many others. At the White House Conference on Fallout Protection, the President reemphasized his support of the national shelter policy, and said that—

along with our military defense and retaliatory forces, civil defense and defense mobilization are vital parts of the Nation's total defense—together they stand as a strong deterrent to war.

Secretary Herter pointed out at the conference that a strong civil defense will strengthen our stand at the conference table. He said:

If, despite our earnest efforts at the negotating table and our defense preparations, we should nevertheless be subjected to nuclear attack, civil defense and measures for fallout protection offer the most practicable and feasible means of saving the greatest number of lives. * * * We should be able to negotiate without threats, ultimatums, or dictation. * * * It will also strengthen the determination of our allies to withstand aggression.

General Twining assured the Conference that a fallout shelter program is a basic part of our total defense. He said:

I feel that this shelter program is essential. It is part of this overall picture we are trying to build of a deterrent to attack against our country.

He further said of a U.S. shelter program:

> It gives the Russians something to look at. They say these people are not afraid; they are digging in * * *.

I am certain of this: fallout shelter is sensible, just as sensible as insurance on your car, and just as necessary. We know as much as we need to know to move ahead now. Given understanding support by the Congress, the national shelter policy can contribute materially to the security of the Nation.

Mr. HOLIFIELD. Governor, will you be back for about an hour, say, at 2 o'clock. It is 12:30 now, and we shall adjourn for lunch and come back at 2 o'clock.

(Whereupon, at 12:30 p.m., the subcommittee adjourned, to reconvene at 2 p.m. of the same day.)

AFTERNOON SESSION

Mr. HOLIFIELD. The subcommittee will be in order.

Governor Hoegh, we have some questions to ask you but before that, I want to refer you to a chart which has been constructed on the result of partial returns of questionnaires sent to all States and to over 100 of the principal cities. We do not wish the record to show that this is entirely accurate because it is incomplete.

Also, the answers to our questions sometimes were so ambiguous that we could not ascertain exactly what they meant but, in general, it portrays, I think, fairly accurately the trend of situations in these different communities.

The chart shows three kinds of answers, as we have tried objectively to evaluate them. The full letters will be put in the record so other people can study them later on if they differ with us on our evaluation.

Where the estimates of shelters are reasonably firm, the figures are shown in black. Where the estimates are guesses or where the replies show only a minimum but a great number are believed in existence, the figures are in green. Where the data cannot be evaluated or where the existence of shelters is still believed but no figures are reported, question marks are shown on the chart itself.

(The information shown on the chart follows:)

Civil defense shelter construction

[Figures based on State replies only]

States	Home shelters constructed	Public buildings modified	Underground control centers	Underground dual-purpose structures	Public schools modified
Alabama					
Alaska	(?)	0	No	0	0.
Arizona					
Arkansas					
California	44	11	No	5+(est.)	1.
Colorado					
Connecticut	50+ (est.)	0	No	0	1+ (est.).
Delaware					
Florida	7	0	No	0	0.
Georgia					
Hawaii	0	0	Yes	0	0.
Idaho					
Illinois	363+ (est.)	(?)	No	(?)	(?).
Indiana					
Iowa	9+ (est.)	(1)	No	0	0.
Kansas					
Kentucky					
Louisiana	0	0	No	0	0.
Maine	100 (est.)	0	No	0	0.
Maryland					
Massachusetts	45 (est.)	0	No	0	0.
Michigan					
Minnesota	50+ (est.)	0	No	0	2.
Mississippi					
Missouri	(?)	0	No	1	0.
Montana					
Nebraska	2+ (est.)	0	No	0	0.
Nevada	2	0	No	0	0.
New Hampshire	0	0	No	0	0.
New Jersey	50+ (est.)	0	No	0	0.
New Mexico	2	0	No	0	0.
New York	(?)	(?)	No	(?)	(?).
North Carolina	25	2	No	0	0.
North Dakota	(?)	0	No	0	0.
Ohio	100 (est.)	0	No	2	0.
Oklahoma	400 (est.) [2]	0	No	0	0.
Oregon	(?)	0	No	0	0.
Pennsylvania	50+ (est.)	0	Yes	0	0.
Rhode Island	2	0	Yes	0	0.
South Carolina	3+ (est.)	0	No	0	0.
South Dakota					
Tennessee					
Texas	(?)	0	Yes	(?)	0.
Utah	50 (est.)	0	Yes	(?)	0.
Vermont	1+ (est.)	0	No	(?)	0.
Virginia	10	0	Yes	0	0.
Washington	200 (est.)	0	No	0	0.
West Virginia					
Wisconsin	8+ (est.)	0	No	0	0.
Wyoming	0	0	No	0	0.
District of Columbia	1+ (est.)	0	No	0	0.

[1] 1 underway.
[2] Tornado.

NOTE.—Blanks indicate reply not received in time for printing.

PUBLIC RELUCTANCE TO REVEAL SHELTER OWNERSHIP

Mr. HOLIFIELD. I want to read you a few excerpts from some replies we have had. For instance, I have here a letter from the office of civil defense in the city of Los Angeles. Mr. Micciche is the director there. In answer to the questions, he says:

There have been approximately 10 fallout shelters constructed in the city of Los Angeles within the past 3 or 4 years. Building permits for some of these have been issued by the Building and Safety Department. We have reason to believe that a number of people have constructed shelters but have not designated them as such by taking out building permits. Some people do

not wish it known that they have constructed a shelter because of their concern over the world situation or because they do not want their neighbors to know it exists * * *.

We find this factor in evidence in quite a few of the letters we have gotten. There seems to be a kind of a shame on the part of people in having an underground shelter or it may be a fear that their neighbors will rush in and take it away from them. I do not know what it is but somehow or other this particular factor ought to be cleared up in some way.

Mr. HOEGH. Mr. Chairman, with reference to that matter, we have made inquiry because we have found that there are people who do not want it disclosed. We find, generally speaking, upon visiting with them, that the reason is that they want to be certain they have the shelter for themselves. They do not want to make it public knowledge and, therefore, have everyone in the neighborhood rush in and take over.

A few years ago it used to be a matter of shame. They were fearful of being known as eccentrics. I think that is being overcome and I think people now look at it more as a patriotic service or duty to construct one of these. Therefore, I think we have overcome the handicap that existed.

Mr. HOLIFIELD. I do not think you have overcome it. You may be making some headway on it because these letters keep on stressing this as one of the points involved in the attitudes of the people. I know you are working to overcome it, but I doubt if it has been quite overcome yet.

Mr. HOEGH. Let me give you an example. In Battle Creek, Mich., we know there are 600 shelters in that community. We have a pretty accurate knowledge as to where they are.

A Chicago newspaperman came in and wanted to interview 25 of them and our office called 25 of them. Nine of them admitted that they had them. Then we checked and found out why the others did not. It was primarily because of the fact that they wanted to keep the shelter for their own use.

(Subsequently, in response to an inquiry, the following information was supplied in reference to OCDM use of the 1960 census:)

SHELTER QUESTION IN 1960 CENSUS

The matter of inclusion of questions in the 1960 census relative to shelters has been discussed by officials of the Bureau of the Census, FCDA, and OCDM from 1957 up to August of 1959. They have been concerned with the possibility of obtaining adequate information relative to basement shelter areas. It was requested that questions be included which would show how many homes in the Nation had basements and what the quality of home basements is with relation to size and depth below ground level. As a result of several field tests, it was determined by the Bureau of the Census that satisfactory information of this nature could not be obtained principally because of the inability of the respondents to supply the required information to the census enumerators. Another difficulty was the disproportionate amount of enumerator time required to obtain any kind of answer.

The result of all this was that the Census people felt it was impossible to include a shelter question in the survey of change and residential finance (SCARF) to be conducted in the 1960 census. However, it was agreed that the question as to whether or not a dwelling had a basement would be included in the national census by having it appear on a sheet which the enumerator would leave at every fourth dwelling in the country. The questions on this sheet are to be answered and mailed to the local headquarters. The specific question

dealing with shelter is: Is this house built with a basement —— on a concrete slab —— or in another way ——? The answers will be tabulated by census tract, county, and States. While not what we had hoped for, the Census people believe that some excellent information will be obtained.

Later this information can be refined and further evaluated through the Bureau of the Census monthly current population survey whose field forces generally have a higher level of competence and experience than the general 1960 census taker.

In another and different Bureau of the Census operation, a new survey to obtain quarterly data on expenditures for residential maintenance, repairs, additions and alterations, we have requested that we be supplied with all possible information on the number of home shelters being built in existing structures.

POLICY ON PUBLIC BUILDINGS

Mr. HOLIFIELD. Continuing with this letter, he says:

Up to the present time, no public buildings in Los Angeles have been modified to provide shelter from fallout. However, the new Federal Customs Building soon to be constructed in the Civic Center area will have shelter potential in one of its sub-basements. As yet, the city of Los Angeles has not constructed an underground control center. No underground structures of a dual civil defense purpose nature have been constructed in Los Angeles. No fallout shelter facilities have been provided in our public schools.

He concludes, after three pages of this, by saying:

The question now arises, How effective is the Federal Government's national shelter policy? Have we given it enough time to unfold? Up to the present moment the construction of family fallout shelters has not reached any appreciable degree of success. It seems to me that your committee certainly can review all the factors involved. A public hearing would bring the Nation up to date on the shelter program.

Then, here is a letter from Mr. Cook, director in San Francisco. In answer to question No. 1, "How many civil defense home shelters have been constructed in your city?" the answer is, none.

How many public buildings in your city have been modified to provide shielding from fallout? None.

Does your local civil defense agency have an underground control center? Yes.

Have any underground structures of a dual civil defense purpose, such as a parking garage, been constructed in your city?

He said, "Not expressly for this purpose."

They have an underground garage there in Union Park, I believe.

Mr. HOEGH. I was in that with him about 6 months ago. That is a very fine fallout shelter for thousands of people.

Mr. HOLIFIELD. The same is true in Los Angeles under the old Pershing Square Park, but the doors, the entrances and exits, have not been fitted so that they could be closed in case of attack. This bothers me very much.

As to this question: Has fallout protection in the form of structural modifications been incorporated in any of your public schools? The answer is "No."

PUBLIC SCHOOL SHELTERS

This school problem is certainly a tremendously important problem and I notice in going through all of these questionnaires, very seldom is anything done at all, even to use existing facilities in the schools.

Mr. HOEGH. That is one reason we are stressing schools as projects. That is prototype shelters. The school people want to do it; the school boards in many instances are willing to do it, but they want actually to see some constructed.

As I mentioned in my previous report, we are doing it in several schools with our prototype program, some in existing schools and some in new ones. I think it will be real helpful and I think it will prove to the school people that you can provide fallout shelter without very much additional expense. If you do it when you are constructing a new structure, I would say the maximum would be in the neighborhood of 3 to 4 percent.

Mr. HOLIFIELD. I think you are right on that. I have looked at some of the designs of a group of architects from down around Oklahoma or Arkansas, and their cost figures show that they could build the schools in such a way that the auditorium would be underground, or some other large facility which could handle the pupils at very little additional cost.

Mr. HOEGH. As soon as these are completed, these prototypes which are now under construction, folders will be made up and they will be converted into documents so we can get that out to all of the school people throughout the Nation. I think that in that way we will stimulate considerable activity among the schools.

I am very pleased to see that Governor Rockefeller included in his legislative proposal that a survey of all State buildings be made, including all schools, so that the same could be converted into fallout shelters.

Mr. HOLIFIELD. The next letter I have is from the capital of our State in Sacramento. The pertinent sentence is as follows:

*** * * To my knowledge no home shelters have been built within Sacramento County and no public buildings have been modified to provide shielding from fallout. We could not at present say we have an underground control center, but we do have an approved Federal project application to engineer such a center There are no dual purpose underground shelters in this area and no fallout protection has been incorporated in any of our public or private shools * * *.**

Here is one from the State of Minnesota from the executive office. Gov. Orville Freeman says:

*** * * The announcement of the national policy on shelters by Governor Hoegh in 1958, while gratifying to me, is inadequate in that the means to carry out the monumental educational program did not exist at that time, nor does it at the present. While I personally feel Governor Hoegh and his staff have accomplished a great deal with the limited resources available to them, it is far from adequate. It is not enough that pamphlets are distributed, television and radio programs and newspaper articles appear supporting such a program. The Government itself must act and until our State legislatures see shelters incorporated in new Federal buildings and existing Federal buildings to provide full protection, they are unwilling to appropriate State money for this purpose * * *.**

He continues:

*** * * This is also true of officials at county and local levels. In their eyes, the Federal program contradicts itself. Counties and municipalities look to the States for leadership and the citizens look to the local government, in turn. There is insufficient direct Federal assistance to local counties and State governments to enable them to carry out their responsibilities.**

Mr. HOEGH. I would like to comment on that, Mr. Chairman.

We have requested funds in fiscal year 1959 and 1960 for this accelerated education and information program to put the public on notice, to acquaint them with the effects of weapons, the nature of the threat, and how to protect themselves. We have requested $9,500,000 in those 2 fiscal years. Our request was cut to $4,335,000, less than half of what we asked for. We do think it is necessary to have our request for appropriations approved.

Secondly, the Government should take the leadership. It should set the example. We have requested of the Congress that they provide funds to permit us to include fallout shelter in all new Federal structures. I think it will be most helpful if that is done because that sets the pace then for State and local governments and also for people.

I agree that we should set the example and we have asked for this. I have confidence that it will be approved this year. It will set a marvelous example throughout the Nation.

Mr. HOLIFIELD. Governor Freeman says that they have identified 50 homes with shelters in Minnesota and that they believe there are more; but, here again, he expresses the feeling that many people fear publicity on this point.

He also says that only two schools in the State have been modified, in Columbia Heights, Minn.

SCHOOL ARCHITECTURE

Here is a typical letter from Rome, N.Y. It says:

*** * * The schools constructed in recent years in Rome are identified by vast expanses of window and walls and with a minimum of shelter potential. Some months ago I wrote to the Rome Board of Education expressing my concern over the lack of shelter potential in the latest additions to the Rome school system and expressed the view that the building, in terms of protection potential, was a glassy horror. I am not aware that this condition differs to any material degree from other cities and the new schools being built. It is one, however, which must be viewed with alarm.**

I certainly agree with that and I can say that the schools in California, in my opinion, are just glass deathtraps for the children because of the great expanses of windows. Any kind of a blast would cause the glass to fly and cut the children all to pieces.

Mr. HOEGH. I might mention here again, Mr. Chairman, that we are stressing that fallout shelters be incorporated in these schools, particularly in assembly rooms, cafeterias, and similar places. To conserve play space instead of using additional grounds, we are urging underground construction. Some schools have started to do it, but I think we need to push, and we are constantly pushing, toward having these fallout shelters incorporated within schools.

Mr. HOLIFIELD. This letter, incidentally, goes on to say that there have been no home shelters constructed in Rome known to the undersigned. No public buildings in the city of Rome, N.Y., have been modified, nor have there been underground structures having dual purposes with civil defense features.

Here is a letter from Phoenix, Ariz.:

To our knowledge there have been six excellent shelters constructed. We have no knowledge of new public buildings in Phoenix being modified.

They say that their local civil defense agency has an excellent underground control center at that place.

In the answer to school modification or protection, they say:

No. However, we furnished plans to several schools for underground shelters and one school in particular has the plans ready and they are being forwarded to the office of OCDM with a request for Federal funds.

Here is one from the State of Ohio:

While the announcement of the national shelter policy was made during Operation Alert in 1958, a considerable period of time elapsed in the development of standards and in the production of promotional material based on engineering data and criteria. It was not until after June 1959 that such data, criteria, and plans were made available for national distribution. The implementation of the shelter program was keyed, of course, to the availability of this basic information.

It says that the standards and criteria published in June 1959 set up financial and structural requirements which actually deter, if not completely prevent, large numbers of people from constructing shelters.

Based on OCDM standards, the total civil defense home shelters constructed in Ohio up to this time probably do not exceed 100. No information is available indicating that any public buildings in Ohio have been modified to provide shielding from fallout. Ohio does not have an underground control center and no underground dual civil defense purpose shelters have been constructed in Ohio. However, two industrial shelters have been constructed, one by the Cincinnati Milling Machine Co. in Cincinnati and one by the Cleveland Twist Drill Co. in Cleveland. This latter is now being used as a cafeteria and it should probably be considered in the dual purpose category. We know of no schools in Ohio with structural modifications specifically incorporated for fallout protection.

Mr. HOEGH. Mr. Chairman, with reference to the point of delay, you will recall that I mentioned in my opening remarks that right after we had announced the national shelter policy before your committee, we came to the Congress and asked for $13,150,000 to implement this policy. They approved only $2.5 million. We used all of the funds in order to do what I outlined previously, but we could have made quicker headway if we had been granted the full $13,150,000.

Mr. HOLIFIELD. I want to read another part of this letter because it is right along the line of what you just now said:

When we asked what changes the Federal policy would require to achieve greater fallout protection, the answer is:

(*a*) A most positive declaration on the need of the United States through one or more half hour radio or television programs throughout the Nation; and (*b*) more positive leadership on the part of Congress in stating the need and creating a more healthy climate and a more united approach to the problem which should not be partisan in any of its aspects, and by providing financial assistance by appropriations adequate to implement Public Law 85-606; recognizing that if the need is as great as it appears to be, delays current and unwarranted attacks and differences on the congressional level should be eliminated as far as possible if we are to expect positive response on the part of the public.

I wanted to read that because I do not want the record to show that I think that Congress has done its part on this. As you know, I have been one of those who has tried to get Congress to do a great deal more and so has Mr. Riehlman and other members of the committee who have worked on this.

Mr. HOEGH. Mr. Chairman, we wish to express our thanks for your support and that of Mr. Riehlman and other members. We do have many friends in Congress who have supported our appropriations in order properly to implement this policy.

I want to say this further: I know the President of the United States is in full support of this policy. When I announced it before your committee, I announced it at the direction of the President of the United States. He believes in it and feels that this program can be put across and should be put across.

USE OF WORD "ADMINISTRATION" IN ANNEX 10 OF NATIONAL PLAN

Mr. ROBACK. Is that why, Governor Hoegh, that particular statement has the word "Administration" rather than "Federal Government"?

Mr. HOEGH. Well, I would say that it refers to the Executive because we could not speak for all branches of the Government. When a policy like this is announced, it is an Executive decision. Then after the Executive decision has been made, it is necessary for us to come to the Congress and ask them to implement this.

Mr. ROBACK. As I recall, that has been made a part of the national plan?

Mr. HOEGH. It is a part of the national plan.

Mr. ROBACK. That was the only document, if I recall correctly, which referred to the administration rather than to the Federal Government, and I wondered what significance it had from the standpoint of policy.

Mr. HOEGH. I think in the national planning, it says the Federal Government; does it not? In my statement, as I made it, I made it for the executive branch of the Government. When the Congress did provide some, although inadequate funds to implement it, it became not only Executive policy, but was also subscribed to, partially, by the Congress.

Mr. RIEHLMAN. Mr. Chairman?

Mr. HOLIFIELD. Mr. Riehlman.

Mr. RIEHLMAN. I want to make this announcement with some mixed emotion and serious upset, particularly because of the loss of a Member of the House just now.

During a quorum call, unfortunately one of our very substantial Members of the State of Washington, Russell B. Mack, dropped dead.

Mr. Chairman, that is one of the reasons I did not get back here at the opening of the hearing. They just eulogized Mr. Mack in the House and adjourned until tomorrow at 12 o'clock.

Mr. HOEGH. I am sorry to hear about that.

Mr. HOLIFIELD. We are all sorry to hear that, and we who have known and served with Congressman Mack for many years realize this will be a great loss to the State and also to the Congress.

I am sure that the record should show this subcommittee's sympathy for the family and our deep regret that this unfortunate event occurred.

FLORIDA LETTER

The next letter I have here is from the city of Tallahassee, Fla. It says:

We have had two inquiries from private individuals for shelter specifications that they might incorporate in residences that they plan to build. We have had no inquiries from subdivision developers or professional builders who are primarily responsible for the extensive home construction program that has been going on for the past few years.

Only the most recently constructed public building at a nearby Federal correctional institution has been modified, so apparently they are going to take care of the felons down there and let the taxpayers do their best.

Mr. HOEGH. Maybe that is starting with the least and hoping for the most, Mr. Chairman.

Mr. HOLIFIELD. The first shall be last and the last shall be first.

We have had in the past 3 or 4 years six new schools opened and have two more under construction. No consideration has been given to fallout protection. If anything, the modern, so-called functional design employed in these new school plants is much more vulnerable than the old, conventional structures.

I am glad to see, as you said in your statement, that you have contacted the architects and some of the top school people on this particular point. I think this is one of the real areas where we could improve just by a change in the method of building, and putting our basketball courts underground or our auditoriums underground, to take care of this sort of a situation.

Governor Hoegh testified before you came in, Mr. Riehlman, that their figures showed that in many instances these schools could provide fallout protection for no more than 4 or 5 percent additional cost in construction if these things were incorporated at the beginning.

Mr. HOEGH. I would like to add this: If the Federal Government were setting the example by going out here and remodeling existing Federal buildings and also by incorporating fallout shelters in these new structures, as we requested funds to do, but which we have been denied to date, I think you would have a great acceleration by school boards, by county, city, and State governments. They would say that the Federal Government is serious and Congress has recognized the hazard and the need for fallout shelters. I think it would catch hold at the local and State levels.

Mr. HOLIFIELD. I agree with you that the Federal Government has got to show a serious intent before the State and local governments do anything.

Then he puts in a criticism of your regional offices that you might consider. I do not know whether it is justified or not, but he says:

For my part, I am not sure that the Federal regional offices are justified. For all of the purposes they serve they are an expensive luxury that "blot up" Federal funds before they can soak down to the grassroots where effective civil defense must germinate.

Mr. HOEGH. I would like to take the opportunity to answer that. I am a great believer in having Government close to people. You cannot run this thing from Washington, D.C. I think you can direct it and you can set policy, but it is most important that you have regional offices working closely with the governments, with the States,

and accessible to city and county directors in the area. That is the reason we have eight regional offices and that is the reason we have competent staffs at these eight regional offices.

Since I have taken over, I have made it a policy to decentralize, to get this service out close to the people. I find that it is giving us good dividends.

You may find one or two that may be dissatisfied but, generally speaking, the State and local governments are most appreciative of the fact that we are out with them trying to serve them. Our mission is to support them and to help them perfect the best plans for their communities and their States.

Mr. HOLIFIELD. I have here a letter from the Office of Civil Defense, city of Minneapolis. They say:

We have no way of knowing exactly how many home shelters have been actually erected in the area. However, there is evidence of a reasonable number. We have had a considerable amount of inquiries and requests for assistance in this area, and we have a building contractor who is specializing in home shelters. He is averaging about two a month, which of course would amount to nothing in a population of over a million. We have several cases that have come to our attention of individuals who have basement rooms or who have built their own outside shelters.

I belive that every industry engaged in defense production should be required to have an adequate civil defense plan as a prerequisite to their contracting in the same manner they are required to have a plant security program. Adequate legislation should be passed to require fallout shelters in new construction, particularly those being financed with Government funds.

The city of New Haven, Conn., has this to say, in part:

The President, the Congress, and many of the members of the Armed Forces have let it appear to the people that our power of retaliation is sufficient to prevent a probable attack. State and local governments have thus been induced to hold civil defense expenditures to the minimum. Industry follows the lead of Government. Under these conditions people find it difficult to understand why it is important for them to build home fallout shelters when government and industry make no serious efforts to do so. As long as the man in the street believes, rightly or wrongly, that his elected leaders do not really and truly expect an attack, he is ready to gamble his life against $500 that it won't happen and he doesn't consider it a real gamble either.

Specifically to answer your question, no building permits for shelter construction have been issued in 1959.

There are several suggestions in the way of tax relief in this letter, including the elimination of local assessment taxes and consideration as an income tax deduction of the amount spent on the shelter. The writer also calls upon Congress to appropriate funds for Public Law 85–606.

The city and county of Denver, Colo., report that 18 shelters have actually been constructed, and they mention the fact that some of the contractors are now planning to put shelters in their stock houses. Three buildings have been modified. They have a control center for the Denver area.

Here again they mention the fact that they have a parking garage which could serve as a fallout shelter, but that it has not been implemented.

The letter suggests that packaged food similar to C rations with Government labels should be made available at reasonable costs to those building shelters.

MULTIPURPOSE FOOD

Mr. HOEGH. Mr. Chairman, I might add this: General Mills, Inc.—not that I am advocating General Mills—have taken a real lead in this field, and they have now prepared a 4½-pound package of processed foods which can be put into a 1-gallon can. That food is adequate to sustain you, if you also use one vitamin C tablet per day, with water, for a period of 2 weeks. They call it the multipurpose food. We have approved this just recently. I am hoping that they and similar industries will stress the sale of this kind of food for emergency purposes.

Mr. HOLIFIELD. Is it a concentrated food similar to the C and B rations?

Mr. HOEGH. Why don't I bring you some tomorrow?

Mr. HOLIFIELD. You might put me on a diet.

Mr. HOEGH. I might add that General Mills did put a man in a shelter for 2 weeks, and he lived on one 4½-pound package, plus the vitamin C tablets and water for 2 weeks. He went in with a flabby 213 pounds and came out a very healthy specimen at 198 pounds 2 weeks later. A physical examination revealed he was in better shape than when he went in. So this will sustain you.

During the war I had to eat chocolate bars, and I am sure it was not half as good as this.

This is one. I hope other industry will come up with the same.

This 1-gallon can costs you $1.50 if you get it in Minneapolis. For us back here, with freight charges it will cost approximately $2 to $2.50 a gallon. Think of that. It will sustain one individual for 2 weeks.

Mr. HOLIFIELD. How long would this food be good?

Mr. HOEGH. They guarantee it for 20 years or more. After you open it, you have to consume it within a matter of a few weeks.

Mr. HOLIFIELD. At least this is advanced thinking along the line.

The State of Washington reports an estimate of 200 home shelters. This is an estimate. There is no direct data except their statement that they estimate that there are that many. They say that no buildings have been modified. They do not have an underground control center. There are no buildings constructed for dual purposes.

They bring up a problem which I know is a problem in many States. In answer to the question, "What changes in Federal policy do you think necessary to achieve greater fallout protection for the people?" their answer is:

> Our State faced a $100 million deficit going into the last legislative session. Of necessity it was imperative to raise taxes where possible. As a result, the State civil defense operation has a very small staff, and this situation is reflected throughout the counties of this State, many of whom are operating with small budgets. The result is that civil defense and other agencies suffer.

The letter goes on to say that:

> The Office of Civil and Defense Mobilization has done a good job with the resources at their disposal. We have been supplied with adequate information regarding shelters and the necessity therefor. However, with the small budget at our disposal it is difficult to disseminate this information throughout the State. We are a long way from the Nation's Capital and, although the news points to world tension, the average person looks to the Federal Government for guidance. I feel a strong statement of policy by the Congress and a similar statement by the President regarding a shelter program would do

much to assist the State to take steps for survival. It goes without saying that the statement should be backed up by adequate financing.

Mr. HOEGH. Mr. Chairman, he made reference there to 85–606. That, in my opinion, was one of the great steps forward in the legislative field in connection with civil defense. By law it was stated that civil defense was a Federal, State, and local government joint responsibility. It stated further that the Federal Government would allocate funds to match the State and local governments' funds for civil defense staffs.

I think I have been before the Congress on five different occasions on which I have emphasized the great need for these Federal funds to assist the State and local governments to carry on this responsibility. In each instance I have been denied. I have come back again now for fiscal year 1961 and have made the same request. As a matter of fact, the President last year sent a special message to the Congress to stress the great importance of having Federal funds for this purpose.

I think the lack of these funds has been an obstacle. I am hoping the Congress will provide the funds so we can go forward. I think with more leadership and direction at the State and local level, you can also accomplish more in the field of shelter construction. This is one way of doing it.

Mr. HOLIFIELD. The last letter which I have here is one from Madison, Wis. They say:

We have no exact figure on the number of home fallout shelters which have been constructed in Madison. We do know that there have been many inquiries about the construction of shelters, and somewhere around 40 people have indicated to us they have done something about it. There has been a general reluctance because of fear of public ridicule. No public buildings have been modified to provide shielding from fallout. Consideration is being given to the matter of school fallout shelters—

but is does not say anything has been done about it. The city of Madison does not have an underground shelter.

No structural modifications have been made for school shelters. However, consideration is being given to the construction of a large fallout shelter in West High School as a part of a rebuilding program. OCDM has been asked to finance this fallout shelter.

I wanted to read a few excerpts from some of these letters. They will be included in the record in total, as will all the letters we have received from all the States and cities. (See app. I.)

Mr. HOLIFIELD. I shall ask Mr. Brewer very briefly to give us a rundown on the chart which the staff has prepared in relation to the questions which have been asked.

SUMMARY OF QUESTIONNAIRE DATA

Mr. BREWER. Mr. Chairman, we asked specific questions on the number of home shelters constructed, the number of public buildings modified, whether the State or city had an underground control center, the number of underground dual-purpose structures, and whether any public schools had been modified to provide protection against fallout.

The answers we have received include those from 35 State Governors and 66 cities. In summary:

Number of underground control centers: five State control centers, nine city control centers.

Number of home fallout shelters: State replies estimate 1,565 plus considerable additional shelters believed to exist. The cities report 356.

Public buildings modified structurally to provide shielding from fallout: The States report a total of 14. The Illinois civil defense organization, however, appears to have a total estimate of 1,100 suitable buildings throughout the State, but their reply was not too clear. The extent to which the buildings have been modified is unknown.

Mr. HOLIFIELD. I might say we are writing letters to clarify some of these questionnaires. We are using this chart here only for today's hearing. As soon as we receive clarification of some of these ambiguous replies and also some of the other questionnaires which have not come in as of this time, we will try to recap it and in the final print we will put as nearly an accurate figure as we can in the record.

Mr. BREWER. Underground dual-purpose structures so reported: The States report 8. The cities report 7, plus an unused subway tunnel in Los Angeles, not modified.

Public schools modified: The States report 4, plus one being planned. Here again, Illinois estimates 30, but these do not appear to have been structurally modified for fallout protection. The cities report one, with one additional planned.

That is a summary of the results to date.

OCDM SHELTER ESTIMATES

Mr. ROBACK. Mr. Chairman, I would like to ask Governor Hoegh in this connection about the statement he made before the Appropriations Committee that people and industries are building thousands of shelters, when our information seems not wholly to support that statement.

Mr. HOEGH. I would say it is fully supported. They are building thousands. There is no question about it.

Mr. ROBACK. How many thousands?

Mr. HOEGH. Based upon the sampling surveys we have made in various communities, based upon the information which we have about those existing facilities which have a potential factor of sufficient magnitude to protect people from fallout and, secondly, based upon our own observations and on our information from industries and from citizens and from local and State directors, I am confident that as of today we have shelter spaces of sufficient protection factor for 25 percent of the people in this Nation.

This chart of course reveals not too many which have been newly constructed. That might be true. That might be the information that they have obtained. Those are based probably upon the construction of family fallout shelters as we have been advocating.

Let me give you an example. Take the State of Michigan. Nothing is listed there for Michigan, but I have been in two areas where I know from my own personal observation and examination and investigation there are over 750 shelters.

Mr. ROBACK. You are not talking about the model city of Battle Creek, are you?

Mr. HOEGH. That and Gratiot County, Mich., where Governor Williams and I both spent a day.

I have been in Hartford, Conn., for example, and I saw the fallout shelters for 12,000 employees at United Aircraft Industries. I actually saw them. I was there. I know that they are stocked and they are ready.

For instance, Pittsburgh. I gave you this morning the example of Jones & Laughlin. I could name many other industries of the same category which are providing fallout shelters within their industries.

And people have them. I live in the Midwest. I am an Iowan. We have many cyclone cellars and many tornado cellars there. So do the people in Nebraska, Oklahoma, and parts of Colorado and that general area, including Illinois and several other States. Those buildings have good fallout protection, and there are sufficient protective factors.

People need to know that they are there and are usable for that purpose. Our information program is directed toward that end.

ESTIMATE OF SHELTER FOR 25 PERCENT POPULATION

I feel confident that today there are adequate fallout shelters for approximately 25 percent of the people of this Nation. To get the next 75 percent is most important. I will say if the Federal Government, particularly the Congress, will provide adequate appropriations to permit us to lead and to set the example, I think it will be accomplished.

With reference to control centers, our information is that today there are some 250 State and local control centers in this country. The Federal Government has contributed some funds for construction or equipment of approximately 100 of the 250.

Outstanding State control centers include, some of which are not listed here: Delaware, Hawaii, Maryland, Georgia, Pennsylvania, Rhode Island, Texas, Utah, and Virginia. Among the better conconstructed and equipped local centers are those in Du Page County, Ill., outside Chicago; Honolulu; Dade County, Fla.; Glendale, Calif.; Milwaukee; Portland, Oreg.; St. Louis, Mo.; Wichita, Kans., and many others.

There are at present 30 State and local facilities under development for which Federal funds have been made available.

You see, we have this policy and we have had this program for some time. With Federal funds we can match the construction of fallout or control centers 50–50 with the State and local governments. Many communities have them already. I have been in the one in Oakland, Calif., as you probably have, Mr. Chairman. There are many others which have this protection. Mobile, Ala., is another one which is not on the list I mentioned. I have personally examined those that I have listed here, except the one in Honolulu. I have not had the time to go there.

Mr. RIEHLMAN. To get back to a statement made by the Governor with respect to 25 percent of the people in industry——

Mr. HOEGH. People of the Nation as a whole.

Mr. RIEHLMAN. There are shelter spaces available in industry and in public buildings sufficient to protect 25 percent of our population as a whole?

Mr. HOEGH. That is right.

Mr. RIEHLMAN. Are those all modified shelters, or are they just areas where the people who made the inspection feel they do get the proper protection?

Mr. HOEGH. Those are areas or shelter spaces which have a sufficient protective factor to enable you to say that it is an adequate fallout shelter.

Mr. RIEHLMAN. But what percentage of that 25 percent has any type of equipment or program to sustain people in case of an attack?

Mr. HOEGH. Let me give you this as an example, Mr. Riehlman. Let us suppose you were living in a massive structure such as an apartment house. If you were on the 4th floor and higher and 3 stories below the top, in that area, if you went in the interior corridor of this apartment building, a massive structure, you would have a sufficient protective factor to protect you from radioactive fallout.

You realize, of course, if the chips are down and there has been an attack, if the apartment house is still standing, you can obtain from your apartment additional food supplies and blankets, and take them back out into the corridor. We have found in massive structures in Tulsa, Okla., Montgomery, Ala., and other cities sufficient protection from radioactive fallout. We are now underway to determine whether it will prove out in New York City and Los Angeles. I think it will.

It is based upon such facts that I estimate that today you have shelter spaces with adequate fallout protection to accommodate 25 percent of the people. The great need is to get the shelter out into the residential areas. That is the area we are emphasizing now. As people work only 40 hours a week, it is most likely they will be in the vicinity of their homes when this thing strikes. Therefore, they should have access to a fallout shelter in their homes or in small community shelters near their homes. That is why, as the chairman has pointed out, it is essential to strengthen the high schools and the elementary schools for fallout protection to afford this additional protection for the people in the various areas.

FEDERAL ROLE IN SHELTER PROGRAM

Mr. RIEHLMAN. Mr. Chairman, I do not feel that at the present time the Nation is lacking in sufficient information as to how to build a shelter. I want to commend the Governor and his staff for the tremendous amount of work which has been done in bringing to the attention of the American people how they can protect themselves against fallout. I have heard myself and have seen it on both radio and television. I have been impressed.

To get back to the other statement which has been made time and time again, I think the chairman and I both agree that the Federal Government must take a greater interest and greater stand in this field if we are to get it accomplished. I am hopeful that sufficient funds will be made available so the Federal Government, at least in 1961, will start a program such as has been outlined here this

morning in our Federal buildings. That certainly should be at least enough indication that the Federal Government has a definite interest in this program. We can use that to influence the people throughout the Nation to protect themselves. I think we all agree one of our basic problems is to get the people interested.

I say again as far as I am concerned, I followed very carefully the outline which was given here this morning, and I think you have done a tremendous job in the last year or 18 months in putting together this material and information and getting it to the people.

DEFINITION OF "SHELTER SPACES"

Mr. HOLIFIELD. Governor Hoegh, I would like to question the statement that you made that 25 percent of the people have shelter spaces. I would like to clarify what you mean by shelter spaces.

Mr. HOEGH. By that I would say there would be areas in which people would have, as the minimum, 12 square feet, and that that area would have a protection factor of over 100.

Mr. HOLIFIELD. In its present condition?

Mr. HOEGH. Yes, sir.

Mr. HOLIFIELD. Without modification?

Mr. HOEGH. Yes, sir.

Mr. HOLIFIELD. How would you reconcile that? Let us take some typical structures. A basement, for instance, with windows in it. Would you consider that as being adequate?

Mr. HOEGH. No, sir.

Mr. HOLIFIELD. Would you consider an underground garage like the garage in Union Park in San Francisco, for instance, as being one of those?

Mr. HOEGH. A subbasement I would, yes, sir.

Mr. HOLIFIELD. What do you mean by subbasement?

Mr. HOEGH. That would be the second layer below the surface.

Mr. HOLIFIELD. The second layer. Regardless of the fact that the openings are open and not closed in any way?

Mr. HOEGH. You would have some place even in the first layer, Mr. Chairman, but they would not be so freely usable as those in the subbasement.

Mr. HOLIFIELD. You would include in that, I suppose, the ordinary basements of frame houses that had no windows?

Mr. HOEGH. No. In that instance they would have to go one step further. If they had a basement with window wells, they would have to have had preparations made, as many people have, to close up the window wells with a cement slab, with sandbags, or with solid concrete blocks. In addition it would be necessary that they cover the floor above the shelter area of the basement either with dirt or sand or other heavy materials. Just throwing library books out on the floor would greatly increase its protection factor.

When you consider a massive structure, take an industrial building where you have cement floors all the way. In that instance the basement and the subbasement, if they had no exposed windows, would have that sufficient protection factor. However, if they had exposed windows, it would be necessary to have either the cement slab, the solid concrete blocks or the sandbags filled either with earth or gravel prepared to close in these window wells. Many have taken that precaution.

ACCURACY OF SHELTER SPACE ESTIMATE

Mr. HOLIFIELD. I am sure I agree with you that many places could be given an increased protective factor, but your statement of 25 percent of the population is predicated upon spaces which exist at this time to protect them. I do not question your sincerity in making the statement, but I question the accuracy of it, because from all the information we have received from people who should know—the people at the local level, the city and State level—their answers to our questionnaire do not bear this out.

Mr. HOEGH. Mr. Chairman, I think they had reference to our home shelter construction, actual construction as prescribed in our "Family Fallout Shelter" booklet.

May I point out again, for instance, the survey of Tulsa, Okla. It has a nighttime population in the commercial area of about 19,500 people. In the daytime there are 73,500 people in downtown Tulsa. Yet in that community today, not tomorrow, not in the future, they have adequate shelter spaces with sufficient protective factors for 69,300 people. That is what our survey showed.

Mr. HOLIFIELD. What is the population of Tulsa?

Mr. HOEGH. About 280,000.

Out in the residential area we found only 9 percent of the structures provided adequate protection. I want to point out that the downtown commercial area has roughly 90 percent.

Mr. Chairman, we are accelerating. These sample surveys are most important. We want to identify these shelter spaces. The local governments are willing to do that. If we assist them by sample surveys so they can take the lesson from those and do it in all the communities throughout the Nation, I am certain, Mr. Chairman, it will sustain the figure that I just stated, 25 percent.

Mr. HOLIFIELD. I hope you are right, but I am not that optimistic.

Mr. HOEGH. I want 100 percent, of course. That is my objective.

(The following information was subsequently furnished by Governor Hoegh:)

FALLOUT SHELTER SPACES IN THE UNITED STATES

There exists in the United States at the present time sufficient shelter spaces to accommodate over 25 percent of the population of the United States.

In 1959 and 1960, the Office of Civil and Defense Mobilization conducted four pilot surveys covering all or part of Milwaukee, Wis.; Tulsa, Okla.; Montgomery, Ala.; and Contra Costa County, Calif. These areas do not include the best potential shelters of the country, but do include areas that were expected to possess a minimum potential and the sampling taken provides a suitable study from which a conservative extrapolation can be applied for the entire country, since they include urban, suburban, and rural areas.

A shelter space is defined as an area of at least 12 square feet with a protection factor of at least 100.

Based upon these surveys we conclude that at least 25 percent of the population have adequate shelter.

In addition, there are many thousands of spaces available from mines, caves, and excavated tunnels. Added to these spaces are the shelters on military bases and those specifically constructed as home shelters, tornado shelters, and industrial shelters.

In New York State a survey showed that over 30 percent of the population had adequate fallout shelter spaces. Other surveys generally sustain these conclusions.

SHELTER CRITERIA

Mr. HOLIFIELD. In the first place, I take great exception to the criteria that you set forth in your statement of 200 roentgens being the goal to shoot for, when you spoke of 200 roentgens as being the amount that a person could take without radioactive sickness. I do not agree with that. I think there is not a geneticist in the country who would not look upon such a level of exposure with great horror.

The amount of radioactivity which has resulted from bomb testings is estimated at around 0.7 roentgen. Yet we have had great concern expressed by the doctors and geneticists on 0.7 roentgen. I am not saying that is justified, because that is so low that, relatively speaking, there is no possibility of any scientist proving genetic damage with 0.7 exposure to the gonads. I shall certainly not make the statement that when the exposure gets up around 25 to 50 roentgens to the gonads it will not have a terrific effect upon the live sperm.

Mr. HOEGH. Mr. Chairman, we are not trying to point out that you should get 200 roentgens. We say you should get less. I mean that seriously.

Mr. HOLIFIELD. You can get that and live?

Mr. HOEGH. Yes. This is an emergency. This is when the chips are down. This is when things are really tough. After the attack people must have less than 200 roentgens. Otherwise you will become ineffective. You will have radiation sickness, and if they get 600 they will likely die.

Mr. HOLIFIELD. The younger people, those in the reproductive cycle of life, must have this protection because that is where the great damage would be done. Some of us who are past that stage are not as susceptible.

Mr. HOEGH. For us it is all right.

Mr. ROBACK. Where did that figure come from?

Mr. HOEGH. From the Subcommittee 14 of the National Comittee on Radiation Protection and Measurements. That committee is made up of the finest scientists and research people in this country, from universities, colleges, Government research agencies, and private research agencies.

Mr. ROBACK. Did they make a specific recommendation on which you are acting?

Mr. HOEGH. No. They said that an individual can take 200 roentgens. It is most likely that he can take a dosage of 200 roentgens within a short period of time, without becoming radioactively ill.

If you get more than 200 roentgens it is most likely you will get radiation sickness, and if you got 600 over a short period of time it is most likely that you would become deceased. Those were the principles laid down by that committee.

Based on that we say that every individual citizen must not be subjected to more than 200 roentgens, preferably much less. That is the caution we give the people.

Mr. HOLIFIELD. I would like to further clarify that figure of 200. That is an accumulated total within a short length of time?

Mr. HOEGH. That is right.

Mr. HOLIFIELD. Roentgens are units of exposure per hour. Therefore, if you were exposed for longer than an hour to an intensity of 200 roentgens you would have accumulatively much more than 200 roentgens.

Mr. HOEGH. That is right.

Mr. HOLIFIELD. That is because the amount would be on a sliding scale. It would gradually go down the same amount. If you were exposed to 200 the first hour, there is a regular formula according to which it goes down in the first 7 hours by a factor of 10?

Mr. HOEGH. Yes.

Mr. HOLIFIELD. However, the amount of radioactivity to which these areas were exposed in bomb bursts was far in excess of 200 roentgens per hour. Some ran as high as 10,000 roentgens per hour, which would mean that through a few minutes of exposure you would get the lethal dose in those cases.

Here is where your so-called shelter spaces or your make-shift shelters fail to function at all. Your basements or shelter spaces which have not been modified would be valuable only in the case of lighter degrees of radioactive exposure and would not be effective at all in areas where the exposure ran up to about 1,000 roentgens or even 500 roentgens an hour or more. They would go right through those buildings and you would soon get more than the 200 roentgens of exposure.

Mr. HOEGH. We found that in these massive structures the protection factor would run as high as 400 and 500.

Let us suppose the protective factor were just 200, and let us assume the dose rate were 1,000 roentgens per hour. There you would get 5 roentgens the first hour. Seven hours later the dose rate inside the structure would be only one-half roentgen per hour.

After 49 hours the dose rate in the structure would have decayed to 0.05 roentgen per hour which would amount to negligible exposure to the people in the structure.

In the first hour people might get as much as 5 roentgens of exposure inside the building, and thereafter the exposure rate would rapidly decrease. Under these conditions the outside accumulated radiation dose during the first 2 weeks would be about 4,000 roentgens, whereas inside the massive structure the radiation dose to people would be only 20 roentgens.

In that instance you would receive considerably less than 200 roentgens during the first 2 weeks, and therefore, there would be no radiation sickness.

Under a different condition, let us suppose he got 275 or 300 roentgens. He would then become ill from radiation exposure, but it is most unlikely he would die until his exposure exceeded about 400 roentgens.

Mr. HOLIFIELD. That is right. That is basically the formula of decay. Without the proper shelter you are taking a tremendous chance on your accumulation.

In the Nevada tests we found that in quonset hut types of shelters, with 3 feet of dirt over them, you could reduce radioactivity by as much as 1,000 times outside, with a penetration of as little as 1 roentgen inside.

This was a completely closed structure with the entrances closed, with a closed off entrance and sandbag fills.

This would not have been true if you had windows, doors, and no roof.

Mr. HOEGH. Again, Mr. Chairman, in that Nevada test we found there was a protection factor of 5,000 with the 5 feet of earth on that dome-type cover. It did withstand 5,000 roentgens.

What I point out is this: When you are three or four stories above the ground, the fallout is down on the ground or up here on the roof. You have to be three stories below the top and you have to be three stories above the bottom.

In between there you will have a protection factor of 2 to 500, depending on the type of structure. That has been shown to us through Technical Operations, Inc., by the Naval Radiological Laboratory, and by several others who have undertaken these specific studies.

Mr. HOLIFIELD. Speaking of places where there is no basement, where it is on the ground and on the roof?

Mr. HOEGH. Yes, sir.

Mr. HOLIFIELD. I think if you will check that quonset hut you will find the reading was 1,000 outside. That is my memory. I might be wrong.

Mr. HOEGH. Mr. Schafer said that one with 3 feet of dirt over it did have a protection factor of 5,000 to 1.

Mr. HOLIFIELD. I will go back and look at some of Mr. Schafer's testimony before us to check on that later.

OCDM COOPERATION IN NEW YORK SHELTER PLAN

Mr. ROBACK. I would like to inquire whether the OCDM reviewed the report sponsored by Governor Rockefeller before it was issued?

Mr. HOEGH. We worked closely with the Rockefeller Committee. I would say we probably did not edit it but we certainly looked at it and we conferred with them and we likewise consulted and advised them to the maximum of our ability.

Mr. ROBACK. Some people who have reviewed this report note that there are no discussions of thermal effects.

Mr. HOEGH. I think the committee is fully aware of the thermal effects and also of initial radiation from a blast.

Whether it is mentioned in that report I do not recall, but I do know they have been thoroughly briefed. I think when we appeared before this committee last year we set out in great detail all the effects of a nuclear weapon, blast, thermal, initial radiation and residual radiation.

Mr. ROBACK. As a matter of policy, New York State is directing its concern to fallout primarily?

Mr. HOEGH. That is right.

Mr. ROBACK. In view of all the information you have prepared and disseminated, particularly the technical information mentioned in your testimony, why would it be necessary for a private firm to prepare a document such as this? It seems a useless expenditure of funds.

Mr. HOEGH. Let us put it this way: I think the Rockefeller committee went to the Ford Foundation and got $200,000. They presented a little more attractive documents than we did. They were very generous with the type of paper they used, the coloring, and so

forth. Of course, we operate is an austere a fashion as we can. We are trying to operate with the least expenditure of money and still get the message across.

Mr. ROBACK. You say this fancier format is the——

Mr. HOEGH. The ones I have seen are; yes, sir.

Mr. ROBACK. Does this present information which is not available through OCDM?

Mr. HOEGH. It is available through us. We have made it accessible. Actually a lot of that may be taken intact from some of our documents. I will not say that exactly, but at least the same basic information was available, and we made it available. We made it available to everyone.

Mr. ROBACK. Even the Governor of Alaska advised us the widest possible publicity would be given to the Rockefeller report on fallout.

Mr. HOEGH. We are supporting it 100 percent. We are urging everyone to read it.

Mr. ROBACK. I wanted to know whether Alaska was depending on the Rockefeller study for its information?

Mr. HOEGH. It might look better when it comes to them, but we have the same sound basic information in our reports.

PUBLISHING OF NATIONAL PLAN

Mr. ROBACK. The national plan for civil defense was promulgated in October of 1958, was it not?

Mr. HOEGH. Yes.

Mr. ROBACK. Is that the first time the OCDM or any predecessor agency has promulgated a national plan?

Mr. HOEGH. I would say that in the past they have had plans to take care of different things, but this is the first time it was put in a single document supported by detailed annexes and appendices.

Before I first appeared before Mr. Holifield and this committee I read all of the material that this committee had in the way of hearing reports, and so forth. I saw in there that there was a great demand and an insistence upon a full national plan, a document which would set forth the mission, how that mission was to be accomplished, and by whom.

I think I set out within 45 days after I took my office to make just such a plan.

I recall the 14 points that this committee outlined. In each instance the 14 points recommended in the past have been complied with in this national plan.

I actually could not have operated this agency without this kind of a plan. I think you have to know what your mission is, how you will get there, and who will get you there. That is most important. It is a practical necessity.

Mr. ROBACK. Is it fair to say that there are stated missions, stated principles, and stated responsibilities, but it has no milestone for achievement, so you never know when this plan is being carried out or how fast?

Mr. HOEGH. No, you have lost the real intent. This is a plan which sets out to protect life and property and to mobilize resources and production. This is a plan we want implemented by action now.

We fully recognize that the capabilities of government at all levels is not such that they can accomplish all of this.

As you will hear tomorrow when they testify on the recovery action, I wish many of these things were done and completed. Yet, knowing the smallness of the staffs in many cities and in many States, we are not in a position to get all this accomplished today, but at least there is the guideline. They have a pattern set.

This is a plan which we estimate is solid and sound with constant revision until 1968. We look at the capability of the enemy today and what it will be in our best judgment in 1968.

Mr. ROBACK. The only point I wanted to bring out is that it is not a plan in the sense that you have milestones of achievement—milestones which permit you to say that here you have achieved, here you have slipped, and here you are ahead.

Mr. HOEGH. Yes. I keep a very accurate progress chart. I want to know where we are on each one of these things.

When I make my report of recovery tomorrow you can question me and I can tell you where we are on these accomplishments.

Mr. ROBACK. Which is the worst and which is the best accomplishment?

Mr. HOEGH. I never evaluate States. I would not do that.

Mr. ROBACK. In the progress chart, which civil defense area shows up best and which one shows up worst?

Mr. HOEGH. I think I can tell you tomorrow when I go into this recovery action.

NATIONAL HEALTH PLAN

Mr. BREWER. You mentioned you keep progress charts on what is happening in the national plan?

Mr. HOEGH. Yes.

Mr. BREWER. I notice this national health plan was recently released.

Mr. HOEGH. Yes.

Mr. BREWER. There was an article in the Washington Post and Times Herald dated March 24, 1960, in which this plan was discussed. The newswriter quoted several comments of the OCDM officials.

First they noted that the plan goes through five subheadings—Federal, State and local, professional organizations, health personnel, and the responsibilities they would have, and it ends up with a subtopic entitled "The Public." It indicates that the individual families are urged to maintain their state of health at high levels and to be prepared in the event of attack.

I have two points: No. 1, the newswriter quotes OCDM officials as stating that—

> Past experience indicates few families would take the necessary steps.

Mr. HOEGH. Of course, let me say something on that quickly. As soon as I read that——

Mr. BREWER. If I may finish the quote?

Mr. HOEGH. I immediately started an investigation to find out who made that statement, because I do not believe it.

Now go ahead.

Mr. BREWER (reading):

> **They said public indifference to civil defense has resulted in an inadequate effort.**

Do you know who made the comments?

Mr. HOEGH. I have not found out yet.

Mr. BREWER. I take it you do not agree?

Mr. HOEGH. I certainly do not.

Mr. BREWER. If I may ask another question?

Mr. HOEGH. Let me tell you the reason for this. We work very closely with the American Red Cross. They present a very fine first aid training course each year. Last year they instructed 4 million Americans on first aid, including treatment for this type of casualty which might occur.

Their record in the past has been quite similar. I think first aid is getting well impressed in the minds of many people throughout this Nation.

DEPENDENCE OF HEALTH PLAN ON SHELTERS

Mr. BREWER. The annex states the people will have to provide for themselves for the first 2 weeks.

Mr. HOEGH. I agree with that.

Mr. BREWER. So that in fact this annex of the national health plan, which indicates that other health resources will not be available, shows it depends on an adequate shelter program. If the people are not shielded for 2 weeks then this annex goes out the window as do many of your other plans.

Mr. HOEGH. No; it would not go out the window. It is most important that people have shelter. I have stated that maybe 10 times today and I will state 10 times again. I know that.

I think the program we have will get us there, but it will take more money provided by Congress in order to implement this national shelter policy adequately and effectively.

The national health plan applies in instances of national disaster when initially the individual is on his own.

If you had a nuclear attack that would be true. Many of these people would have to be within their shelters for as long as 2 weeks and perhaps even more. Some would require less. Therefore they must have the capability of providing first aid, their own medical care and treatment.

However, it is just as important that the local government and the State have a capability of using all of the surviving medical personnel to give additional treatment to people who might have been affected by thermal blasts or radiation effects. That capability, therefore, must be directed through the Public Health Service down into the State health services, down into the local communities.

You can do that only by having pre-prepared plans available, personnel designated and resources to back them up. That is the only way it can be done. That is what that plan is for.

Now the Public Health Service is in the process of getting down into the State and local governments working with those State and local government and public health officials, with the American Medical Association, Hospital Association, and many other people who have a capability of rendering medical service.

This annex sets that up, gives the overall direction, the overall coordination. You could never accomplish that without that plan and without action, and the action is underway.

DECISION ON SHELTER AND EVACUATION POLICIES

Mr. BREWER. Are you still planning on evacuation of some sort?

Mr. HOEGH. We advocate two tactics. When I was with the military I was with a pretty good division, probably one of the best. It was the 104th Infantry Timber Wolf Division led by a Texan.

When we were on maneuvers and in the desert area I was surprised to find we went on defense quite a bit. Not only were we on the assault but also on the defense.

I remember one maneuver exercise where they had a movement which moved our division back about 80 miles. I was the operations officer. I was insulted. So was the general.

I thought this: wars were to be won by attack. That was the principal tactic. Why learn defense?

I went to the European theater and I soon found out. I found out it was necessary to have the capability of defense. We had to go on defense on several occasions.

One division which was put on defense didn't know how to execute it, and was overrun. We never were overrun by the enemy.

We had two tactics, offense and defense.

In the nontarget areas there is one tactic—take the best available cover, a shelter.

In the target areas there are two tactics. You should plan either to move your people into prepared reception areas, if time and conditions permit or, if time and conditions do not permit, then you should take immediate cover.

Who makes that decision? The Director of the Office of Civil and Defense Mobilization does not make that decision. It is like the War Department or the Pentagon giving us the two tactics, defense and offense, but they didn't tell us from there whether we were to attack or go on the defense. The general right on the ground gave us that decision.

The same is true of a nuclear attack. The local community, the target city, is headed by an executive, a mayor. He is the leader of the people of that community.

When he gets the information that there is going to be an attack upon his city, he has to make the decision, with the advice of a good staff, as to whether or not there is sufficient time to move his people away from the horror and the hell of blasts or whether or not they should take shelter.

He makes the decision and not me.

We urge that every city have the capability. It is too late to learn how to move people when the chips are down. You should have that capability.

Mr. BREWER. I asked that question because I noticed the American Medical Association made a study of national emergency medical planning about a year ago for OCDM. They came up with a conclusion. They said that target areas had not been prepared.

I notice you spelled out in great detail the work being done in surveying populated centers but we have had no information on the efforts to build up reception centers even though you say there is this two-pronged focus.

Mr. HOEGH. Many communities have prepared this.

Mr. BREWER. I merely note this conclusion by the AMA study group that certain areas have not been——

Mr. HOEGH. There is a great deal of misunderstanding as to those tactics. Many times you look to a country like Sweden and you say, "They must really know."

Here is what they say and print:

We in Sweden never speak about evacuation or rescue or shelters as isolated methods, but always speak of them as three components of an established system, each single component being as important as the other.

The first principle in shelter planning is that all modern buildings and built-up areas, dwelling houses, industrial buildings, hospitals, schools and so forth should be provided with a shelter when being built.

That is the same as our principle.

We are working hard on evacuation planning and we hope to be able to tell every potential evacuee, in peacetime, not only in what direction he is to go if war comes but also at least to general location and, in many cases even the name of the community.

There are two tactics, and the Norwegian people, the Swedish people, the Danish people, and other foreign countries recognize they must have two tactics.

Mr. ROBACK. Your agency really did not recognize that for the longest time, until the committee practically beat you over the head.

Mr. HOEGH. That was before you started beating me, I tell you that.

Mr. ROBACK. I am talking about the agency. There is no personal reference.

OCDM REVIEW OF INFORMATION

I might inquire in that connection, if I may, Mr. Chairman. From time to time over a period we have received complaints about activities of individual employees of the civil defense agency from people who have been recipients of pieces of promotional literature or exposed in training courses to examination questions which have been silly or stupid or in bad taste. Those things probably are bound to happen in any big agency, but in view of the fact that you are the President's delegate, and for the first time the Executive Office of the President has been enlarged by as many as 1,700 employees in your agency, you have a special responsibility to supervise the kind of information that goes out over the country. You direct, in a sense, an educational agency. The largest part of your testimony has been devoted to demonstrating the amount of information from OCDM that goes around the country.

To what extent do you supervise the content of the information which is distributed?

Mr. HOEGH. I would say I examine close to 90 percent or more of it. I try to examine 100 percent of it.

Mr. ROBACK. In a course which is set up for instruction or lectures, do you examine the curriculum?

Mr. HOEGH. In most instances I would be familiar with it, probably not 100 percent but in most instances.

Mr. ROBACK. Do you pass upon the people who will appear and lecture in behalf of your agency?

Mr. HOEGH. Not all of them. In many instances I do.

Mr. ROBACK. Does your agency hold courses for religious groups?

Mr. HOEGH. We do work with the clergy. For instance, about 2

months ago I worked with the Mormon Church in Salt Lake City and spent half a day with them. I am pleased to report that they are going to provide for fallout shelter in their new structure. In addition to that, these people have been practicing a very good survival program of having at least 30 days' supply of food. So we work with the clergymen of all faiths.

Mr. ROBACK. Do you have instruction courses or lecture courses where the clergy are called together in one group?

Mr. HOEGH. We do. I would say in the States, the States probably have the clergy together about once a year. We will send people to those meetings, and likewise we will have such a school for the clergy about twice a year.

Mr. ROBACK. Do you pay the expenses of the lecturers or of the clergy?

Mr. HOEGH. No; I do not think we do that. We do of our own personnel.

Mr. ROBACK. You do not pay the expenses or the salary of any clergy for any instruction?

Mr. HOEGH. None other than our own personnel.

Mr. ROBACK. How many seminars are held for the clergy in a year?

Mr. HOEGH. That would be difficult for me to say, outside of what we have for our own office. I could give an estimate as to those held by our own offices. I would say three in the last calendar year, 1959.

Mr. ROBACK. Would you reproduce literature that has been the subject of a lecture, let us say, for dissemination among the clergy?

Mr. HOEGH. It would be very exceptional that we do that. We do more in the way of urging the churches to provide fallout shelter in their own churches, to have a capability of rendering service to people, such as first-aid treatment, such as mental strengthening. We urge them, of course, to advocate that the people in their congregations take these actions for their protection.

Mr. ROBACK. Do you recall the October 1958 session?

Hr. HOEGH. Where was that held?

Mr. ROBACK. Of the clergy seminar?

Mr. HOEGH. No; I do not recall it.

Mr. ROBACK. I think it was probably in Battle Creek.

Mr. HOEGH. I do not recall that.

Mr. ROBACK. Invited were 68 clergymen; 21 States and 18 religious denominations were represented in this group. They were addressed by one Dr. George S. Benson. Do you know Dr. Benson?

Mr. HOEGH. No; I do not.

Mr. ROBACK. Did you review the selection of Dr. Benson?

Mr. HOEGH. No; I did not.

Mr. ROBACK. Do you know what the content of his lecture was?

Mr. HOEGH. I am sure I do not.

Mr. ROBACK. Did you ever receive any complaints about it?

Mr. HOEGH. About Dr. Benson?

Mr. ROBACK. About his lecture.

Mr. HOEGH. Not that I know of. I have not personally known about it.

Mr. ROBACK. I may say that we have received complaints through one of the clergy about the content of the lecture. This is not unusual. You are bound to get complaints about such matters. That

is why I asked the question in the first place as to the degree of supervision, because this lecture in large part was exhorting the clergy to be more militant in the fight against communism. Why would that be a subject of discussion for a meeting on civil defense?

Mr. HOEGH. I am of the same opinion on that one. I hate communism. I hate everything it represents. I am against it.

Mr. ROBACK. I mean——

Mr. HOEGH. If one of the people spoke up and said he was against communism, I am pleased about it.

Mr. ROBACK. If he stated that one Dexter White, working through Mr. Morgenthau and Mr. Roosevelt, was responsible for all our evils in Europe today, would you subscribe to that in a civil defense lecture?

Mr. HOEGH. I do not know, of course, the record of this White or anyone else, but anyone who is against communism, I am for him. I am with him 100 percent.

Mr. ROBACK. I ask you, is that an appropriate subject for a civil defense lecture under Federal auspices?

Mr. HOEGH. To be against communism? I say "Yes."

Mr. ROBACK. Don't make any mistake or put an improper interpretation on this question.

Mr. HOEGH. I am not. Let me just make sure that you understand what I mean.

Mr. ROBACK. We are not arguing as to whether anybody is for or against communism. The only question I asked is whether that type of lecture is appropriate for a civil defense, Government-sponsored course for the clergy.

Mr. HOEGH. Let's put it this way: Maybe it is, to motivate certain people. For instance, I think one of our real obstacles is that, "It can't happen here." You hear that. I think it is necessary to point out accurately just what communism is and that it wants to dominate the world, that it is atheistic and that it is against the free enterprise system and the individual rights of people.

Mr. ROBACK. Governor Hoegh——

Mr. HOEGH. I am against that kind, and if it will stimulate people to recognize that they have a responsibility of keeping that kind of government from impressing its will upon us, that it takes shelter, that it takes preparation, then I am for using it.

Mr. ROBACK. Governor Hoegh, do you believe that as the delegate of the President it is your function to exhort the clergy against communism? That is the question I am asking you.

Mr. HOEGH. No. I don't use that normal practice; but I certainly defend anyone in my agency who stands up and says he is against communism, because he is speaking my mind when he says that. I hate it, not just despise it.

Mr. ROBACK. Governor Hoegh, nobody in this room differs with you on the subject of communism. That is not the subject of this discussion. You understand that.

Mr. HOLIFIELD. The subject of this discussion, Governor, is the propriety of speeches which are made which are essentially political in nature at a religious conference. I do not know how these people come there, whether they come with the right to speak their own mind. If they do, of course, I know how hard it is to keep a person on the subject. We have this digest which was sent in to us by some-

one, of this lecture by George S. Benson, president of Harding College. It has to do with religion in national defense. It goes pretty far into the political realm in castigating the Democratic administration by inference. It also makes a number of statements which were in error at that time, such as, we are keeping a minimum of 120 military planes in the air every minute of every day with bomb bays loaded and with mechanics on board to trigger the atomic aspect of the bombs. It is quite a fanciful speech. It might be a good speech on some occasion, but I doubt if it is proper for a civil defense meeting.

Mr. HOEGH. To get the record straight, Mr. Chairman, no doubt——

Mr. RIEHLMAN. I think in all fairness to the Governor and to the members of the committee, we should have that speech that the counsel is interrogating the witness about. I know nothing about it. You know nothing about it. I am sure you do not want to ask him to give his stamp of approval to a speech that he has not seen.

Mr. ROBACK. Mr. Riehlman, I did not ask him to approve the statements in the speech.

Mr. RIEHLMAN. I think it most unfair to the witness, Mr. Counsel, to take out of context a statement which is made by someone and ask him to comment on it, until he has had a chance to read the whole speech and find out who made it and whether or not it was a speech that was authorized by the Director of Civil Defense. I would like to see a copy of the speech.

Mr. HOLIFIELD. You will have a chance. I had not seen the speech. I do not think counsel's remarks were out of order in the way he presented them.

Mr. HOEGH. Mr. Chairman, just as in industrial conferences, at these conferences we will have a businessman give a paper. These papers are not processed by us beforehand. They are representatives of that group.

Mr. ROBACK. That is the only question I asked, Governor Hoegh: What the degree of supervision was.

Mr. HOEGH. That will not always happen. At industrial meetings, maybe Jones & Laughlin's representative will stand up and make a presentation. He does not clear that with us. The Chase Manhattan Bank——

Mr. ROBACK. Your office informed us, Governor Hoegh, that if the facilities for duplication were not overloaded and the funds were available, you would have distributed that speech on request of the clerical group, which wanted copies of it. There was a resolution by this group which said they would like to have copies of this speech.

Mr. HOEGH. If it was not distributed, it must have been stopped by me or someone else on my staff.

Mr. ROBACK. We will identify the speech to you, and you may report back to us tomorrow.

RADIATION ALARM DEVICE

Mr. HOLIFIELD. I would like at this time to ask you a few questions. We had Dr. Libby before us at our last year's meeting of the Joint Committee, and he showed us a warning device attached to several dif-

ferent types of radios. Dr. Libby has been very much interested in this and has been trying to get manufacturers to install it in their radios. I wonder if you would give us a report at this time of the status of this matter in your agency and whatever cooperation you may have had with Dr. Libby on the radio warning.

Mr. HOEGH. I would like to make this statement, if I may.

While fallout shelters provide the basis for protection against fallout radiation, radiation instruments are required to permit the most effective use of fallout shelters.

We are proud of the progress made in the last year toward filling the need for these family instruments. On October 23, 1959, I announced the availability of reasonably priced radiation meters for personal use in fall out shelters or homes. A set of instruments, including a device for measuring radiation rate, a device for measuring total radiation dose accumulated, and a companion unit needed to set the meters, is now available for purchase by the individual citizen at a price of $20. This cuts the previous price by more than one-half.

These instruments are simple, rugged, and reliable. They are based on a time-proven quartz fiber electroscope principle. There are no radio tubes to burn out or electrical meters to be broken if the instruments are dropped. The power comes from a single flashlight cell which will operate the equipment for a very long time. Actually this flashlight battery is the only thing to wear out, and if you keep a spare in the refrigerator where it will last for a couple of years or more you can expect to pull the rest of the instrument set off the shelf and find it working at any time you need it.

There is, however, one minor disadvantage—a watch or clock with a second hand is needed when radiation rate readings are made. However, you can get a reasonably correct reading just by counting seconds to yourself. This set of instruments can enable a family to determine—

(1) The safest areas in a home without shelter.

(2) The length of time it would be necessary to remain in shelter.

(3) When it would be safe to move from the shelter to other parts of the house.

(4) The total accumulated radiation dose.

It is important to measure both dose and dose rate. The dosimeter gives you an indication of how much radiation damage you've received, while the radiation rate meter tells you how rapidly this damage is occurring.

Mr. Chairman, I am sure that you and the members of your committee in your studies of fallout radiation problems have long since learned the meaning of radiation level and radiation dose and the difference between them. Also, I am sure that you have found, as we have, that these are rather difficult concepts to get across to the general public.

In our instruction manual prepared for the family radiation detection instruments we are using an approach to explain this that seems to be working. I would like to describe it for you.

Think of dose rate, roentgens per hour, as you do miles per hour. The rate meter, when exposed where you are located, indicates the number of roentgens per hour you are receiving, just as the speedom-

eter of an automobile indicates the number of miles per hour you are traveling. When you see your speedometer showing too high a speed for road conditions, you slow down to protect yourself. When the rate meter indicates too high a radiation rate, you should enter and stay in a shelter to protect yourself. Both instruments are related to time. Driving 60 miles per hour for 1 hour will carry you 60 miles and, if you are in a location where the dose rate is 60 roentgens per hour and you remain there for 1 hour, you will have an exposure of 60 roentgens.

A dosimeter measures the total dose you get. Think of it this way—it would not be practical to figure the number of miles you have driven if your speed had varied and you had only a speedometer in your car. That is why every car has a meter which records the total number of miles driven. Similarly, you need a dosimeter to add up for you your total radiation dose.

We hope the price of radiation instruments for the public can be further reduced. Last spring we issued a broad invitation to industry to propose possible methods of designing such equipment. As a result, four contracts were awarded on the basis of proposals we received which showed promise.

Mr. HOLIFIELD. Were these for measurement instruments or detection?

Mr. HOEGH. These are for detection and measurement.

Mr. HOLIFIELD. Detection and warning?

Mr. HOEGH. Warning and measurement, both.

Mr. HOLIFIELD. This is interesting and I would like to have it in the record, but my original question was directed to the audible warning device.

Mr. HOEGH. I will come to that soon.

Mr. HOLIFIELD. All right.

Mr. HOEGH. These include a contract to develop a simple, transistorized Geiger counter survey meter. In this case we are taking a circuit known to work and trying to reduce its cost. Progress to date is very promising. The other contracts for family instruments are more in the category of long shots. We are working with devices which inherently are inexpensive but need to be improved in terms of their reliability. If any one of these comes through, we will achieve a major reduction in the cost of such equipment, perhaps even into the $4 to $5 class.

Recently, we received from the Atomic Energy Commission a copy of the National Bureau of Standard's tests on combination radio and radiation alarm devices which employ cadmium sulfide crystals as the detecting elements. These instruments, unfortunately, showed an unacceptably wide variation in accuracy. Also, their accuracy changed after radiation exposure or just with the passage of time. We are asking scientists at the Naval Research Laboratory to look into this problem and see if anything can be done to improve the stability and accuracy of the cadmium sulfide or other solid-state type detectors.

Recently, we asked the National Academy of Sciences to convene a special working group to consider the broad problems of radiological instruments for the citizen. Although the final report has not been received, I have received a letter from Dr. Lauriston S. Taylor, Chairman of the group, which lists a number of points on which there was full agreement.

(*a*) Instruments should give quantitative information; e.g., in roentgens per hour for rate meters. There is no need for an instrument that only provides a radiation alarm.

(*b*) While all the desirable characteristics of a citizen's instrument may not be attainable, it appears quite feasible to provide a satisfactory device.

(*c*) Perhaps the most difficult problem to be faced is that of insuring effective use of the instrument: specifically, the proper interpretation of readings, the application of information on the effects of various dose levels, and the translation of information into effective protective action by average citizens.

I want to emphasize this last point. An instrument by itself does not provide protection. Further, its readings are useless unless people have been educated to understand their meaning. We don't expect the average person to learn the full meaning of such things as roentgen, radioactive decay, and effective biological dose, but we do believe we can set forth the important considerations in such a way that an individual can read an instrument and, with the handbook, make decisions which will materially better his chances for survival.

I have mentioned that we are moving forward on several approaches to the problem of providing adequate radiation instruments for family use. Let me expand on my earlier statements concerning projects which at this time look promising.

An instrument is under development which may make possible the direct measurement of radiation rates with very inexpensive, simple and proven components. It is based on the quartz fiber dosimeter but will eliminate the present requirement for an auxiliary timing device. Observation of the position of a hairline on a scale will give the radiation rate directly. No batteries or electronic components would be involved in the instruments. The device would be approximately the size of the present dosimeter or a common fountain pen. The contractor, Bendix Aviation Corp., Cincinnati, Ohio, is scheduled to complete its investigations this summer.

Two projects are underway to improve the operations of quartz fiber electrometer-type dosimeters now in common use throughout civil defense and presently recommended for family use. If successful, the presently required external charger would be incorporated within the dosimeter and even the need for the single flashlight battery would be eliminated. One project is investigating the feasibility of incorporating small solid-state batteries into the standard dosimeter. Presently available types of solid-state batteries, such as are used in missiles or other equipment requiring miniaturized circuits, are being tested for their stability over long periods of time and the effects of temperature and radiation on their voltage characteristics.

The other approach to providing built-in dosimeter chargers is the investigation of the use of devices which produce the required voltage as a result of mechanical strain or previously stored electrical charge, such as storage condensers. In addition to the requirement for long-term stability, etc., the incorporation of a self-charging device into a dosimeter involves the problem of switching, that is, connecting the source of electricity to the dosimeter proper when it requires recharging. Both Victoreen Instrument Co. of Cleveland, Ohio, and Bendix are scheduled to complete their projects on these devices this coming fall.

The project which appears capable of producing the earliest acceptable new advance in the development of instruments for the gen-

eral public is that involving the Geiger counter which I briefly referred to a few minutes ago. In this instrument we are dealing with a type of electronic circuit which has been well developed and in use for measuring nuclear radiation for more than two decades. The most critical problem has been the development of the Geiger counter tube itself. This tube must be capable of measurement of radiation levels considerably higher than those normally encountered in peacetime.

The research to date has produced a tube which is capable of measuring radiation rates in the range recommended by the National Academy of Sciences of 1 to 100 roentgens per hour with excellent stability. The tube is about the size of the eraser on a pencil and with its transistorized circuit is being incorporated into a case about the size of a flashlight. The instrument will operate on one or two standard flashlight batteries. It is expected that the wholesale cost in quantity production would be below $15.

The contract with Anton Electronic Laboratories of New York for the development of this instrument is scheduled for completion this spring.

In addition to the development of instruments for the general public, we are continuing to expand and improve our family of radiological instruments for operational purposes.

Mr. HOLIFIELD. You have given us a lot of information on measuring instruments, but I am not quite sure yet whether you have answered my question or not. My original question was with regard to the device Dr. Libby demonstrated to the Joint Committee on Atomic Energy when he appeared before us last year. He was trying to get the manufacturers to accept a device which would emit an audible squawking noise and which would indicate there is radioactivity. As I recall, it was not a measuring device but a warning device.

Is your answer responsive to my question?

Mr. HOEGH. Yes, sir. I quoted Dr. Taylor. We are following the recommendation of the National Academy of Sciences.

There it is stated "Instruments should give quantitative information; that is, in roentgens per hour. There is no need for an instrument that provides a radiation alarm only."

I can tell you, Mr. Chairman——

Mr. HOLIFIELD. So the answer is that the OCDM has turned down the audible warning device alone as being insufficient to answer the purpose, and you are concentrating on a device which detects and measures rather than detects and warns through audible means?

Mr. HOEGH. If you have this kind of device, which detects and measures, then you give people an opportunity to seek better protection, better shelter than you would if you used an instrument which gave you just warning.

Mr. HOLIFIELD. I can understand you have a more valuable instrument in this case. It is also more expensive, is it not?

When Dr. Libby made his statement he said they felt they could get it down to around $5.

Mr. HOEGH. We hope this combination will be down to about $4 or $5, also.

(The following statement was submitted by Governor Hoegh on the radiation alarm device:)

RESULTS OF NATIONAL BUREAU OF STANDARDS TESTS ON BANSHEE

The National Bureau of Standards' tests on combination radio-radiation alarm devices which employ cadmium sulfide crystals indicated that—

(*a*) Of the over 900 cadmium sulfide crystals purchased by Tracerlab, Inc., only 21 were found which they thought would operate in the circuit of the Banshee.

(*b*) The Bureau of Standards tested 17 of these Banshee alarm detectors installed in portable radios.

(*c*) Only 2 of the 17 instruments tested met the accuracy specifications of plus or minus 35 percent. This accuracy specification was recommended by the National Academy of Sciences and adopted by OCDM and AEC for radiological instruments for individuals.

(*d*) Two additional detectors of the 17 were in the range of plus or minus 50 percent.

(*e*) Four additional ones were in the range of plus or minus 60 percent.

(*f*) The remaining nine were far beyond these limits as follows:

(1) One responded as though the level were 280 r/hr. when exposed to 100 r/hr.

(2) One responded as though it were only 21 r/hr. when exposed to 100 r/hr. If an individual were planning for 6 hours of activity outside his shelter under these conditions, his meter would indicate that his exposure would be 6×21 or 126 r, a dose which he could tolerate without becoming ill. However, he actually would be exposed to 6 × 100 or 600 r, a dose which would surely be fatal.

(3) 2 of the 17 instruments could not even be heard when the dose rate was 1,000 r/hr.

(4) The instruments required 20 minutes to respond to dose rates of 1 r/hr.

The major conclusion that must be drawn from this test report is that cadmium sulfide crystals, as used in the Banshee, do not provide a detector which is accurate and reproducible within reasonable limits, as required in a citizen's instrument.

PROTECTION OF FOOD SUPPLIES

Mr. HOLIFIELD. My next question would be this:

Has there been any effort to put our excess food supplies in shelter? I refer to a fallout shelter.

Mr. HOEGH. As I will develop in our national food plan, the people would depend not only on their own individual supplies but that which is on the merchants' shelves, wholesalers, jobbers, and ultimately would depend upon the Federal Commodity Credit Corporation's stockpiles of food. As you know, they have approximately more than 2 years' supply of wheat. They have more than 4 to 5 months' supply of corn in excess of normal consumption each year.

The Almighty has been real good in putting a covering over this grain, corn and wheat, and this stockpile of food is edible after it is washed and cleaned. Of course, it would mean the people would have to grind it and then eat it with water, or whatever else they might have, if it is necessary to go back to using this type of food.

Therefore, today many people look at the farm surplus as a surplus but I look at it more as a good asset. It is a good asset to have backing up the total defense plan of this Nation, not maybe a 2-year supply, but at least 4 months' supply of normal consumption to back up all of these other sources of food. I think we are fortunate in this country to have that abundance.

I go to Europe each year to attend a NATO conference and I confer with these countries on civil defense, shelter, food, and the rest. There they have a deficiency in food and fortunately we have this surplus which is an important resource for the maintenance of peace. Some people may object to eating wheat and corn ground, but again I say it is better than a chocolate bar.

Mr. HOLIFIELD. I may have gotten a little bit into tomorrow's presentation with that question, and I will not go further than that because I think it is more properly something which belongs to tomorrow's presentation.

I would also think that the protection of medical stocks and the surplus of hospital and surgical equipment would come properly in tomorrow's presentation, so I will withhold that at this time.

Are there any questions?

Mr. RIEHLMAN. No questions.

SITING OF MISSILE BASES

Mr. ROBACK. Later in the week, Governor Hoegh, we are going to hear from the Air Force and the Navy with regard to their concepts of missile base location, hardening, mobility, and matters of that sort. One of the concerns expressed by the chairman is that, as you harden a base, you invite concentrated attack and greatly multiply the load of nuclear material. The civil defense implications of the base hardening program stand out, and the question is, have you been consulted in any manner with respect to the problem of missile base siting in the United States?

Mr. HOEGH. We work very closely with the Department of Defense, very closely. I not only know what the present bases are, but I also know those that are projected.

Mr. ROBACK. I assumed that.

Mr. HOEGH. They all have a bearing upon our planning.

Mr. ROBACK. General LeMay said he works closely with you, and you work closely with the Air Force. If a question comes up of whether you shall locate a pad on the west side or the east side of a base, because of the direction of the prevailing wind, do you have to approve it, or are you in a position to make a recommendation on specific base siting?

Mr. HOEGH. I usually find this: They are fully cognizant of the prevailing winds and they are most anxious to take those things into consideration.

Mr. ROBACK. Have you made an analysis of the base locations for ICBM's from the standpoint of fallout implications?

Mr. HOEGH. Yes.

Mr. ROBACK. Will you submit that for the record?

Mr. HOEGH. I could not for the record. I think anything that is projected into the future would have to be treated as top secret.

Mr. ROBACK. We will limit it to the bases that can be identified in the public record.

Mr. HOEGH. We can do that. We have that.

Mr. HOLIFIELD. I do not think any security element will be involved.

The House Appropriations Committee record shows the locations of the hardened bases, something like nine of them in the ATLAS and

five TITAN. That is shown on page 780 of part 3 of the 1961 hearings of the House Appropriations Committee.

These locations are spotted on public maps and the downwind contamination from a great many of them would come across what we call the "breadbasket of America," Nebraska, Kansas, and Iowa. Some bases are to the west, a string of them from the northern part of the United States on down to Texas.

The resultant radioactivity would be very intensive, providing the amount of megatonnage necessary to successfully assault a hardened base was used.

In the very act of making it difficult to destroy, the hardened base also becomes the reason for very vigorous attack and the use of many times more megatonnage than would have to be used on a soft base.

The factor of civil defense enters into this immediately, considering the tremendous area of country that would receive concentrations of radioactivity running into many thousands of roentgens, and also the contamination of soil and food supplies, not only of the ground area involved but of the stored surpluses which are in granaries located in that area.

Mr. HOEGH. Of course, Mr. Chairman, those food supplies with proper washing and cleaning are still edible.

Mr. HOLIFIELD. That would be dependent upon the amount of residual radioactivity.

Mr. HOEGH. As soon as you get in there——

Mr. HOLIFIELD. Would it be in the grain itself?

Mr. BREWER. Mr. Chairman?

Mr. HOLIFIELD. Yes?

Mr. BREWER. Our replies concerning the development of evacuation reception centers have been rather fragmentary and I wonder if the OCDM would supply the committee with a report on that? It may be interesting to know that the evacuation reception centers in this particular area apparently have not been prepared. The District of Columbia reply indicated they were relying on Virginia and Maryland for the care and treatment of evacuees. Virginia says that it has no reception centers and we have had no reply from Maryland.

It would be helpful for the record if we could have an OCDM tabulation of that.

Mr. HOEGH. Yes, sir.

Mr. HOLIFIELD. Also, if you care to submit to us the formula by which you arrived at your estimate of 25 percent of the people being covered by shelters, going into such details as you can on the degree of protection involved and the type of shelter you visited. We would like to have that.

Mr. HOEGH. I will be happy to do so.

(The information referred to above follows:)

EXECUTIVE OFFICE OF THE PRESIDENT,
OFFICE OF CIVIL AND DEFENSE MOBILIZATION,
Washington, D.C., May 13, 1960.

Hon. CHET HOLIFIELD,
Chairman, Military Operations Subcommittee,
House of Representatives, Washington, D.C.

DEAR MR. CHAIRMAN: During my appearance before your subcommittee on March 20–21, 1960, I was asked to provide three reports:

1. A study of the fallout threat to man and agriculture posed by the Atlas and Titan missile sites which have been announced by the Department of Defense. In this connection, it should be noted that of the 16 proposed missile bases, 15 are to be located at places already considered as targets under annex 1 of the national plan. OCDM and the Department of Defense coordinate closely on the matters of location of facilities and on target lists. DOD participated in the development of annex 1 of the national plan and is presently reviewing an OCDM target list which applies the principles of annex 1. DOD advises OCDM regarding location of facilities, and we have also been in consultation with DOD on the matter of location of missile bases.

2. A paper concerning the development of the evacuation reception centers. In addition, I am enclosing a volume that may be helpful to the committee as background information on reception centers. It constitutes a résumé of the emergency welfare annexes to the State survival plans.

3. The basis for my estimate, "that as of today we have shelter spaces of sufficient protection factor for 25 percent of the people in this Nation." (See p. 61.)

The three reports are enclosed. Thank you for the opportunity to furnish them for the record.

Sincerely,

LEO A. HOEGH.

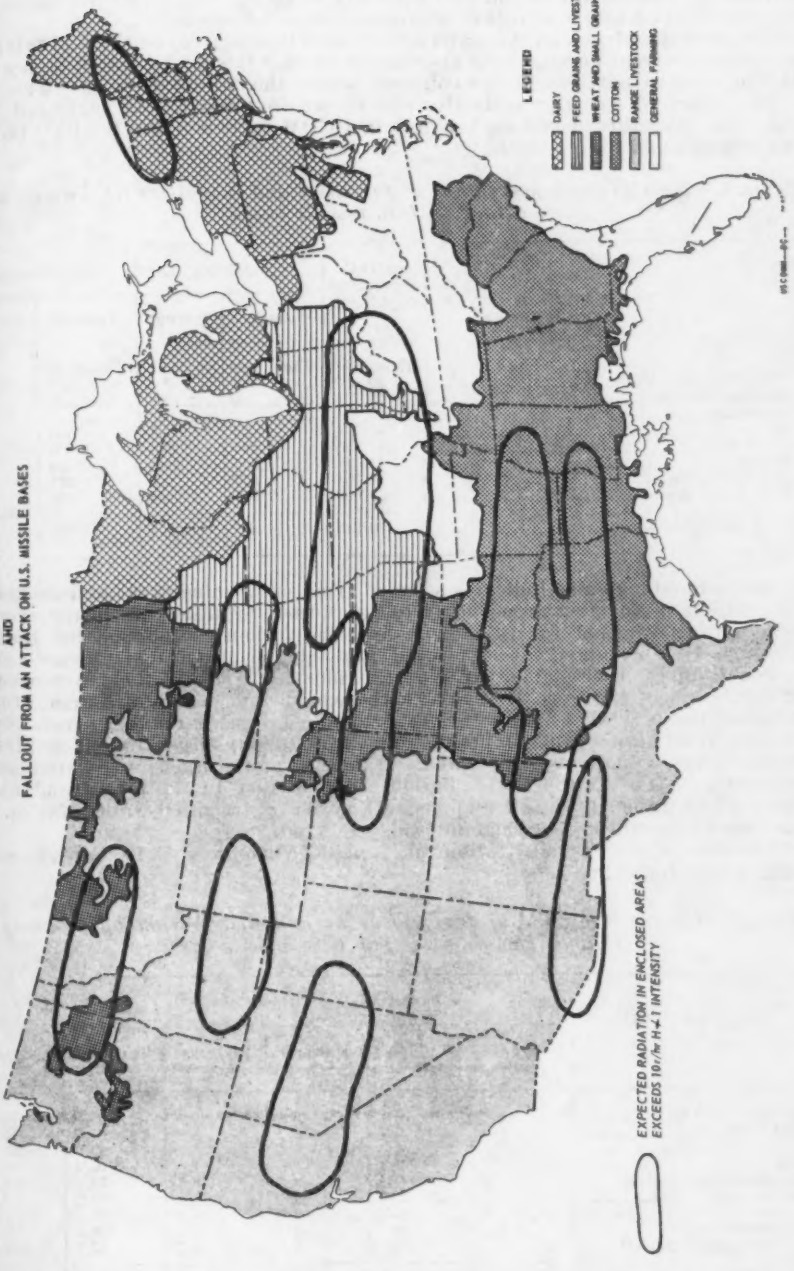
EFFECTS OF WEAPONS DELIVERED ON U.S. MISSILE BASES

The following is an analysis of some of the fallout effects on man and agriculture which could result from the detonation of a 5-megaton weapon on each of 107 launching sites of the proposed 16 missile bases. The locations of these 16 proposed missile bases have been publicly announced by the Department of Defense. Three to nine launching sites have been indicated to be located at each base. The total number of weapons assumed to be detonated is 107, one for each launching site. The detonations assigned to Vandenberg Air Force Base at Lompoc, Calif.; Warren Air Force Base at Cheyenne, Wyo.; and Offutt Air Force Base at Omaha, Nebr., are assumed to be air bursts as hardening is not contemplated at those locations. All others are ground bursts.

The attack pattern employed is just one example designed to illustrate the potential fallout threat posed by these missile bases. An actual attack on these missile bases might vary considerably from that indicated. Specifically, if the enemy chose to allocate more than one weapon or weapons of greater fission yield to each launch site, or if all detonations were ground bursts, the fallout problem would be magnified accordingly.

The distribution of the fallout from this attack is illustrated on the enclosed map entitled "Generalized Types of Farming and Fallout From an Attack on U.S. Missile Bases." The contours shown enclose the areas where the H+1 intensity would exceed 10 r./hr. Within these contours there would be lesser areas where H+1 dose rates would exceed 3,000 r./hr.

- 2 -


GENERALIZED TYPES OF FARMING
AND
FALLOUT FROM AN ATTACK ON U.S. MISSILE BASES
LEGEND
DAIRY
FEED GRAINS AND LIVESTOCK
WHEAT AND SMALL GRAINS
COTTON
RANGE LIVESTOCK
GENERAL FARMING
EXPECTED RADIATION IN ENCLOSED AREAS
EXCEEDS 10r/hr H+1 INTENSITY

In developing the fallout situation a weapon design of 50 percent fission, 50 percent fusion was assumed. Also, average annual wind data were used. This accounts for the uniformly west to east character of the fallout. On any one day the actual shape and direction of the fallout patterns might vary from these which are based upon average annual winds. However, these patterns do indicate in general the extent and intensity of the fallout problem which would develop from an attack of this magnitude on these missile bases.

The contours shown on the map enclose areas in which casualties and fatalities would occur from an attack on the missile bases. Casualties would be heaviest in the western portions of the contours where the fallout is most intense.

The expected casualty estimates are shown in table 1. As suggested from the map, casualties would be heaviest in OCDM regions 5 and 6 which include the Midwest and Plains States.

TABLE 1.—*Numbers and percentage of fatalities and casualties from an assumed attack on U.S. missile bases*

	OCDM region 1960 population	Fatalities		Total casualties	
		Persons	Percent	Persons	Percent
	Thousands	*Thousands*		*Thousands*	
1. Northeast-New York	33,051	200	0.6	335	1.0
2. Middle Atlantic	34,730				
3. Southeast	24,594				
4. Midwest	30,752	30	.1	130	.4
5. Southwest	17,835	1,325	7.3	2,350	13.1
6. Plains	14,411	1,725	11.8	3,150	21.9
7. Pacific Southwest	17,758	500	2.6	575	3.2
8. Pacific Northwest	6,092	350	5.4	450	7.2
United States	179,223	4,130	2.3	6,990	3.9

The enclosed map also indicates selected types of farming areas and delineates the portions of farming areas likely to be affected by fallout from the average wind pattern selected for this example. The fallout on portions of Kansas, Missouri, Illinois, and Indiana, would probably be of most significance since it would affect appreciable parts of the important grain- and livestock-producing farms in the Corn Belt and in the wheat and small grain area. Other farms of these types would be covered by the fallout extending across South Dakota, Washington, and Montana. The fallout extending from New Mexico across Texas, Oklahoma, Louisiana, Arkansas, and Mississippi, would affect production in the Cotton Belt. Fallout from strikes in California and Idaho would affect range livestock and general types of irrigated valley farms. A small area in northern New England is also affected.

The effect of the assumed fallout on farms of various types is shown in more detail in the following table.

TABLE 2.—*Generalized type of farming areas and distribution by intensity of fallout from an attack on U.S. missile bases*

Type of farming	Percentage of preattack acreage					Preattack acreage in farms 1,000 acres
	Over 3,000 [1]	1,000 to 3,000	301 to 1,000	100 to 300	Under 100	
Fruit truck and mixed	0	0	3.1	0.6	96.3	67,354
Range livestock	0	2.7	6.3	3.3	87.7	283,606
Wheat and small grain	0	4.3	6.3	7.0	82.4	179,274
Dairy	0.4	2.1	1.8	1.0	94.7	104,063
Feed grains and livestock	.2	6.8	9.4	13.1	70.5	164,186
General	.2	2.0	6.1	7.6	84.2	112,328
Cotton	.2	8.2	8.6	6.4	76.6	174,897
Tobacco and general	0	0	0	0	100.0	19,419
Special crops and general	0	3.7	4.3	4.7	87.1	52,190
Total	.2	4.1	6.3	5.9	83.8	1,157,837

[1] Expressed in roentgens per hour as of h+1.

Farmland or other resource facilities denied by fallout may be reoccupied for emergency operation in accordance with the following schedule without subjecting occupants to more than 200 roentgens effective biological dose (EBD). A 200 r. EBD is taken "as a reasonable guide in planning for survival under emergency conditions" by the National Committee on Radiation Protection and Measurements:

Days after attack for emergency reactivation

Maximum h+1 rate (r./hr)	Average applicable protection factor		
	No protection (PF-1) [1]	Outside work (PF-2.5)	Inside work (PF-5)
100	0.2	Immediately	Immediately
300	2.0	0.2	Immediately
1,000	18.0	3.5	0.8
3,000	65.0	23.0	7.0
10,000	200.0	110.0	45.0

[1] Protection factor or shielding factor.

It can be seen that nearly 84 percent of the Nation's farmland could be used without interruption. An additional 6 percent could be used after a short waiting period of 5 hours provided shelter is used when not working. Only a little more than 4 percent of the acreage would be denied long enough to prevent the completion of planting or harvesting operations that might have been underway at the time of attack.

Although certain types of farms specialize in specified types of livestock or dairying, some of each class of livestock is found in any specified type of farming area. A large amount of poultry is produced in the Cotton Belt and in fruit and truck farming areas. Beef cattle and hogs are included in the dairy farming areas. For this reason, some damage would be incurred by each class of livestock. The amount of such damage is shown in table 3 below:

TABLE 3.—*Livestock, total and distribution by fallout at h+1*

Class of livestock	Percentage with fallout					Preattack total	
	Over 900 r./hr.	450 to 900 r./hr.	21 to 450 r./hr.	1 to 20 r./hr.	Under 1 r./hr.	Unit	Amount
All cattle	5	3	17	3	72	1,000 head	94,652
Milk cows	4	2	12	2	80	do	20,012
Milk sold	3	1	8	3	85	Million pounds.	81,969
Cream sold	5	3	16	2	74	do	455
Hogs and pigs	4	3	21	3	69	1,000 head	56,451
Chickens sold	1	1	11	2	85	do	960,969
Eggs sold	3	2	12	2	81	Million dozen.	2,650

Seventy-five percent of all beef cattle shown under 20 r./hr. at H+1 are safe and available for breeding or meat. The additional 17 percent affected by fallout ranging from 21 to 450 r./hr. could be expected to survive, provided the attack came when the cattle were on dry forage or if they could be withdrawn from pasture and placed on dry forage, and thus avoid contamination from ingestion of radioactive iodine. This isotope is highly dangerous to grazing animals during the first 90 days or so after H+1. Three percent of all cattle are in areas where shelter would be required for survival; and the 5 percent in areas where H+1 dose rates exceeded 900 r./hr. would be lost.

For dairy cattle the picture is somewhat more favorable. Eighty percent would be located in areas with a safe level of radiation, i.e., 1 r./hr. at H+1 and 85 percent of the usual milk supply would be free of radioactive iodine and usable immediately. Sventy-four percent of the usual cream supply would be immediately available. An additional 2 percent of the milk cows (producing 3 percent of the milk and 2 percent of the cream) are located in areas in which grazing animals would survive, but which would require a 90-day (from H+1) waiting period before milk or cream would become free of radioactive iodine.

An additional 14 percent of milk cows (producing 9 percent of the milk and 21 percent of the cream) would require uncontaminated forage; and 2 percent in areas where initial dose rates exceeded 450 r./hr. would require shelter to survive. Four percent located in areas where initial does rates exceeded 900 r./hr. would be lost.

The situation for hogs and poultry is not usually as critical as for grazing animals. They are fed primarily on harvested grain and could be moved into shelter promptly in an emergency. Most hogs and poultry under shelter will survive an initial outside H+1 dose rate of 900 r./hr. This would include all but 4 percent of the hogs and all but 1 percent of the chickens. Three percent of the chickens for egg production would be lost.

Although fallout from the assumed attack on the missile bases only would cause relatively more casualties among the livestock population than among the human population, the food situation would by no means be critical. An attack on missile bases would have little effect on inventories of processed foods, and livestock numbers could be reestablished.

A more serious problem would arise in connection with the possibility of land contamination by radioactive strontium. The question of the severity of this effect hinges in part on the chemical availability of the strontium to plants. Since strontium reacts similarly to calcium, this problem is particularly acute in areas of low calcium content. Also, since strontium tends to concentrate in the milk it would be most serious for dairy farms. It is possible that monitoring would disclose the presence of available radioactive strontium in sufficient amounts to preclude dairying and plant food production in portions of the land downwind from the assumed bursts. If this should happen, some shifts in type of farming on specific farms might be required. This problem would be minimized in the example used, however, because most dairy- and fruit- and vegetable-producting areas escaped the more serious fallout. These areas might be expected to be relatively free from strontium. Strontium 90 is a long-lived isotope whose bone-seeking properties make it particularly dangerous if ingested as a part of contaminated plant food or dairy products. Grain and forages produced in contaminated areas can be fed to meat animals or poultry without affecting their use as food, provided excessive contamination is avoided. Plants grown on soils of low calcium content are much more likely to take up strontium through their roots than are plants grown on land of high calcium content. Fallout from this attack was most severe in the central and western parts of the United States where calcium content is relatively high. Thus, areawide shifts in farming would not be required.

In summarizing, this study indicates that fallout from a nuclear attack on the proposed missile sites will cause proportionately more casualties in livestock than it will in humans; but because of the flexibility inherent in agricultural production it does not appear that this threat will significantly add to the postattack national food supply problem. However, this does not in any way alleviate the problem of distribution of agricultural products from areas of surplus to areas of need. Also, it should be recognized that this does not necessarily constitute the enemy's overall attack pattern. He may well include large population and industrial centers as well as Atomic Energy Commission bases and other military installations which would increase the effects of fallout on agriculture.

Reception Centers for Evacuees

The terms "welfare center," "reception center," "reception area," "welfare center area," etc., are defined differently by the States. In one State plan a welfare center is an evacuee collection and distribution point, in another it covers a specific geographic area, while in another it includes both a center headquarters and an area.

There are few, if any, reception centers or areas prepared to the extent of having personnel assigned on a permanent basis, equipment and supplies prepositioned, and shelter provided against radiation. We are not sure our level of preparedness would ever reach this stage in view of the cost that would be involved, as well as the impracticability of setting aside large amounts of resources.

Instead, States and localities have taken the sounder approach of designating those areas that would receive evacuees and developing plans for their reception and care, including coordinated agency organizational assignments, identification of resources, and other appropriate measures. Through these activities, carried out under the State survival plan projects, a reasonably adequate degree of readiness has been achieved.

Reception areas have been designated for 243 cities, as tabulated below. As one example, plans exist for the evacuation and dispersal of the people of

Minneapolis-St. Paul into 52 counties of the State of Minnesota and into 9 western counties of Wisconsin.

Each plan gives details for the operation of the reception areas. Generally, the plans include the following elements: Organization, assignment of personnel, line of command, reception areas and reception headquarters, plans for registration, feeding, clothing, housing, financial assistance, registration form, and compilation of resource data. They cover actions to be taken under conditions of strategic warning, tactical warning, attack, and postattack situations.

Such plans are occasionally tested in local exercises. Tests have been conducted successfully at such places as Binghamton, N.Y., Portland, Oreg., and Chico, Calif.

Below is a listing of the number of cities by OCDM region and State, for which reception areas have been designated, followed by a list of the cities involved:

Region 1:	
Connecticut	7
Maine	7
Massachusetts	13
New Hampshire	3
New Jersey	4
New York	11
Rhode Island	1
Vermont	2
Puerto Rico	4
Total	52
Region 2:	
Delaware	2
District of Columbia	1
Kentucky	7
Maryland	2
Ohio	9
Pennsylvania	9
Virginia	4
West Virginia	3
Total	37
Region 3:	
Alabama	5
Florida	5
Georgia	6
Mississippi	4
North Carolina	7
South Carolina	0
Tennessee	5
Total	32
Region 4:	
Illinois	7
Indiana	8
Michigan	2
Minnesota	2
Wisconsin	4
Total	23
Region 5:	
Arkansas	4
Louisiana	4
New Mexico	6
Oklahoma	2
Texas	5
Total	21
Region 6:	
Colorado	3
Iowa	2
Kansas	4
Missouri	5
Nebraska	5
North Dakota	4
South Dakota	4
Total	27
Region 7:	
Arizona	3
California	9
Hawaii	1
Nevada	10
Utah	1
Total	24
Region 8:	
Alaska	3
Idaho	4
Montana	7
Oregon	1
Washington	12
Total	27
Grand total	243

Alabama:
Birmingham
Montgomery
Gadsden
Mobile
Huntsville

Alaska:
Juneau-Douglas
Fairbanks
Anchorage

Arizona:
Phoenix
Yuma
Tucson

Arkansas:
Little Rock
West Memphis
Fort Smith
Blytheville

California:
Los Angeles
San Francisco Bay
San Diego

California—Continued
- Sacramento
- Stockton
- Fresno
- March Air Force Base
- Castle Air Force Base
- Travis Air Force Base

Colorado:
- Denver
- Colorado Springs
- Pueblo

Connecticut:
- Hartford
- New Britain-Bristol
- New Haven
- Waterbury
- Bridgeport
- Stamford-Norwalk
- New London-Groton

Delaware:
- Wilmington
- Dover

District of Columbia: Evacuate to Virginia, West Virginia, Maryland

Florida:
- Homestead-Miami-West Palm Beach
- Tampa-St. Petersburg
- Orlando
- Jacksonville
- Tallahassee

Georgia:
- Savannah
- Macon
- Atlanta
- Columbus
- Augusta
- Albany

Hawaii: Honolulu

Idaho:
- Pocatello
- Boise
- Mountain Home
- Idaho Falls

Illinois:
- Chicago
- Peoria
- Rockford
- Decatur
- East St. Louis-Belleville
- Rock Island-Moline
- Springfield

Indiana:
- Gary-Hammond-East Chicago
- South Bend
- Fort Wayne
- Indianapolis
- Evansville
- New Albany-Jeffersonville
- Terre Haute
- Muncie-Anderson

Iowa:
- Davenport
- Columbus Junction

Kansas:
- Kansas City
- Salina
- Topeka
- Wichita

Kentucky:
- Louisville
- Ashland
- Paducah
- Lexington
- Hopkinsville
- Frankfort
- Henderson

Louisiana:
- New Orleans
- Shreveport
- Lake Charles
- Baton Rouge

Maine:
- Kittery
- Portland
- Brunswick
- Augusta
- Bangor
- Limestone
- Presque Isle

Maryland:
- Baltimore
- District of Columbia

Massachusetts:
- Boston
- Worcester
- Springfield-Holyoke
- Fall River
- New Bedford
- Lowell
- Lawrence
- Brockton
- Pittsfield
- Otis Air Force Base
- Hanscom
- Barnes Field (Westfield)
- Naval Air Station (South Weymouth)

Michigan:
- Detroit
- Grand Rapids

Minnesota:
- Minneapolis-St. Paul
- Duluth

Mississippi:
- Jackson
- Gulfport
- Columbus Air Force Base
- Greenville Air Force Base

Missouri:
- St. Louis
- Kansas City
- St. Joseph
- Jefferson City
- Springfield

Montana:
- Great Falls
- Missoula

Montana—Continued
- Billings
- Anaconda
- Columbia Falls
- Butte-Glasgow
- Helena

Nebraska:
- Omaha
- Lincoln
- South Sioux City
- Hastings
- Sidney

Nevada:
- Carson City
- Stead Air Force Base
- Reno-Sparks
- Hoover Dam
- Nellis Air Force Base
- Henderson
- Las Vegas-North Las Vegas
- Fallon
- Hawthorne
- Babbit

New Hampshire:
- Portsmouth
- Concord
- Manchester

New Jersey:
- Camden-Philadelphia
- Trenton
- Phillipsburg-Easton
- New York-New Jersey

New Mexico:
- Santa Fe
- Los Alamos
- Albuquerque
- Alamogordo
- Roswell
- Clovis-Portales

New York:
- New York City
- Niagara
- Nassau
- Rochester
- Syracuse
- Binghamton
- Buffalo
- Troy
- Albany
- Plattsburgh
- Utica-Rome

North Carolina:
- Raleigh
- Durham
- Winston-Salem
- Greensboro
- Charlotte
- Asheville
- Wilmington

North Dakota:
- Bismarck
- Minot

North Dakota—Continued
- Grand Fork
- Fargo

Ohio:
- Columbus
- Cincinnati
- Toledo
- Steubenville
- Akron
- Canton
- Dayton
- Youngstown
- Cleveland

Oklahoma:
- Oklahoma City
- Tulsa

Oregon: Portland

Pennsylvania:
- Philadelphia
- Reading
- Scranton-Wilkes-Barre
- Altoona
- Lancaster
- Erie
- York
- Johnstown
- Harrisburg

Puerto Rico:
- San Juan
- Aguadilla
- Ceiba
- Ponce

Rhode Island: Providence

South Carolina: Survival Project contract consummated too late to initiate area planning.

South Dakota:
- Pierre
- Sioux Falls
- Rapid City
- Igloo-Provo

Tennessee:
- Memphis
- Nashville
- Tri-Cities (Kingsport, Johnson City, Bristol)
- Alkor (Alcoa, Knoxville, Oak Ridge)

Texas:
- Houston
- San Antonio
- Fort Worth
- Dallas
- Austin

Vermont:
- Montpelier
- Burlington

Virginia:
- Hampton Roads
- Richmond
- Roanoke
- District of Columbia

Washington:
- Tacoma
- Bremerton
- Olympia
- Seattle
- Everett
- Widbey Island
- Hanford
- Vancouver
- Spokane
- Euphrata-Moses Lake
- Grand Coulee Dam
- Walla Walla

West Virginia:
- Charleston
- Huntington
- Wheeling

Wisconsin:
- Milwaukee
- Green Bay
- Madison
- Superior

Wyoming:
- Cheyenne
- Casper

Mr. HOLIFIELD. Thank you very much, Governor.

We will be in room 1501 tomorrow morning. That is the Government Operations Committee room. We will meet at 10 o'clock.

Mr. HOEGH. Yes, sir.

Thank you, Mr. Chairman.

(Thereupon the hearing was adjourned at 4:25 p.m.)

CIVIL DEFENSE

Part II—Post-Attack Planning

TUESDAY, MARCH 29, 1960

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON MILITARY OPERATIONS
OF THE COMMITTEE ON GOVERNMENT OPERATIONS,
Washington, D.C.

The subcommittee met at 10 a.m., Hon. Chet Holifield (chairman of the subcommittee) presiding.

Members present: Chet Holifield, Joe M. Kilgore, Mrs. Martha W. Griffiths, and R. Walter Riehlman.

Also present: Herbert Roback, staff administrator; Carey Brewer, special consultant; Douglas Dahlin, staff attorney; and Paul Ridgely, investigator.

Mr. HOLIFIELD. The subcommittee will be in order.

Governor, referring to your voluminous prepared statement, I see that your experience of yesterday didn't teach you a thing.

This material will be received for our files, and I trust that you are ready now to summarize it?

Mr. HOEGH. Yes, sir.

(The documents referred to will be found in the files of the subcommittee.)

FURTHER STATEMENT OF LEO A. HOEGH, DIRECTOR, OFFICE OF CIVIL AND DEFENSE MOBILIZATION

Mr. HOEGH. The Office of Civil and Defense Mobilization was created July 1, 1958. It took the place of the Federal Civil Defense Administration and the Office of Defense Mobilization. The close relationship between military preparedness and nonmilitary defense readiness, and the vital importance of both, demanded that the nonmilitary defense functions be vested in no one short of the President.

The President has delegated to the Director of Civil and Defense Mobilization the total nonmilitary defense responsibilities. The Director actually serves as his chief of staff for nonmilitary defense. Unified guidance and direction are now assured.

FEDERAL ROLE IN CIVIL DEFENSE

It seems little known that for almost 8 years, civil defense, by Federal law, had been primarily the responsibility of the States and their political subdivisions. The Federal role was informational and advis-

ory. Congress recognized this weakness by passing Public Law 85–606 in 1958 which:

1. Declares civil defense to be the joint responsibility of Federal, State, and local governments;

2. Enables the Federal Government to assist the States and cities with their civil defense administrative and personnel costs;

3. Permits Federal financial assistance for training State and local personnel; and

4. Authorizes distribution of federally purchased radiological instruments throughout the Nation.

Reasons:

There are eight major reasons for the importance of implementing Public Law 85–606:

1. An early start on this program will enable the Federal Government to carry out the decision of the Congress to enter into a nonmilitary defense partnership with State and local governments. Only in this way can Federal, State, and local governments combine in a truly national civil defense capability necessary to national survival in a nuclear age.

2. Through this contribution program the Nation will obtain the full use of all government personnel and resources at the State and local level. Approximately 5 million employees now working for the State and local governments would be trained and ready to serve the people in case of nuclear attack.

Yesterday I gave some of the reasons for Public Law 85–606. I would like to add three or four more.

3. This program in my opinion provides an economical method to obtain civil defense capability. The Federal contributions will support only civil defense staff personnel and administrative expenses of State and local governments—and in return the State and local governments will use all personnel and resources for emergency action.

4. This program provides the Federal Government a sure method of obtaining coordinated national action. This is most essential for an effective civil defense.

5. State and local government officials have fully endorsed this proposed program. They have, in most cases, indicated that they are most willing to accept their responsibility on the 50–50 partnership arrangement.

6. Under the matching fund device, the Federal Government sets an example for an effective civil defense. The action of Congress in providing funds will be tangible evidence to the people that Congress is serious about civil defense.

7. The heart of civil defense is the State and local government. The funds will strengthen their civil defense capability.

Mr. ROBACK. We have talked a little about the matching system, and the standards. Will you talk about that?

Mr. HOEGH. Yes; I will.

Public Law 85–606 requires a merit system for all civil defense employees at the State and local level, thus assuring more stability, competence, and stature of the State and local civil defense staffs.

Mr. ROBACK. Has that been developed?

Mr. HOEGH. We have developed that in conjunction with the Department of Health, Education, and Welfare. The plans are available.

Every State and local government has subscribed to it and they are prepared to operate under the merit system. The same type of system as is now being used by the Federal Government, with the State and local governments, in the Department of Health, Education, and Welfare, and the Department of Labor.

Mr. ROBACK. This contemplates, does it not, a contribution by the Federal Government which would vary according to State population, or some other factor?

Mr. HOEGH. Yes, sir. It is based on a criteria we worked out with State and local governments. A certain percentage based upon population, another one based upon the criticality of the area, and the other factor is state of preparedness.

Mr. ROBACK. Do you have a norm, a desired level of personnel in the States that you would like to see attained?

Mr. HOEGH. For instance, today we find on an average throughout this country that you only have approximately one and a half per person, per county. This is on an average throughout this country. To do what? To coordinate the total civil defense effort for the protection of our greatest resource, people. We certainly feel that in many of these areas that are critical they should have a coordinated program.

The State and local governments in many instances find their funds are not adequate and, therefore, civil defense gets on the final end of the totem pole and doesn't get the recognition that it should have and the financial support that it should have in order to adequately protect people in case the chips are down.

Mr. ROBACK. What are you asking for personnel assistance in this appropriation?

Mr. HOEGH. We have asked the Congress, since the Congress enacted the law which was in August 1958, for the sum of $1 million per month, or a total of $12 million for each fiscal year. Those funds would be used to match State and local government funds for the employment of civil defense staffs and administrative expenses and, as I mentioned, in return you get the total effort, the total personnel, the resources and facilities of the State and local governments to be coordinated within the civil defense plan.

Mr. ROBACK. How many people would that appropriation permit the States and local governments to employ, approximately?

Mr. HOEGH. I think almost 4,000 additional employees.

Mr. ROBACK. What is the present complement of the OCDM in the civil defense field?

Mr. HOEGH. I didn't hear that.

Mr. ROBACK. What is the size of the civil defense staff within OCDM?

Mr. HOEGH. Within my agency? We are now approximately 1,660 with 700 of those in the field offices. Such as manning our three training centers, our staff college, and the eight regional offices.

Mr. ROBACK. Hypothetically, could you not, with 600 or 700 people in the regional offices, coordinate this effort without the successive coordinating layers in the State and local governments? I mean apart from the question of whether you would like to do it that way?

Mr. HOEGH. No, sir: I would not. This civil defense capability cannot be obtained by a Federal force. We must make maximum

use of all governments at all levels, State and local. There you have the personnel that are bound to serve people. There you have the resources and the facilities available.

USE OF MILITARY RESERVE PERSONNEL

Mr. ROBACK. Does it follow from that concept, Governor, that it would be of no particular point to invest this function in a military corps, like the National Guard or the Reserve, or other group; and further, that this would be a function which would not be absorbed properly by compulsory service? Does this follow from your position?

Mr. HOEGH. The Department of Defense and myself are in total agreement that this civil defense capability cannot be carried out by the military forces. First, they would not have sufficient people to do it. Secondly, they do not have the access to the resources and the facilities that the governments have. Thirdly, when there is an attack, the military mission is primarily that of retaliation and the defense from military assault on this country, and I would hate to think that we would put the civilian protection and survival, third in line, and it must never become that. It must be a civil effort that has its primary mission of protecting people.

I think it is a good system for the reason that we have worked out with the Defense Department an arrangement whereby when the chips are down, initially, most of the guard forces in this country would be called upon to support the State and local governments. And I think that is important insofar as law and order, maintenance of law and order, rescue work, and other items like that are concerned. That is the arrangement that we have today. That is an arrangement that we have every day.

For instance, when a national disaster strikes, the civil defense director coordinates it for that State government. The Governor makes accessible the National Guard forces for the support of that local community, and they go in and assist these people in their recovery and in relieving them of the disaster.

Mr. HOLIFIELD. Let me understand you. Is there a formal arrangement whereby the National Guard will not be subject to a call into the Federal service in wartime?

Mr. HOEGH. This is the arrangement we have: First of all, the National Guard has as its primary mission military defense. That is very true. But, as you know, right today, the National Guard is under the command of the Governor of the respective States. It is a State force.

Mr. HOLIFIELD. In peacetime.

Mr. HOEGH. Yes, sir. Now, with a sudden attack—and this could be a very sudden attack—in that instance, initially the guard would not be called to take care of a military mission, but would respond to the command of the respective Governors of the respective States. That is the arrangement that is made today with the exception of six that have been mobilized or that are for M-day mobilization. There are six divisions with M-day mobilization, which means they become military.

Mr. HOLIFIELD. How many divisions does that leave for this peacetime task or civilian task?

Mr. HOEGH. It would leave 21 divisions.

Mr. HOLIFIELD. What consideration has been given to the Reserves?

Mr. HOEGH. In the Reserves, we are working now with the military to accomplish that same end, that they should, initially, go in to support the guard and the local and State governments.

Mr. HOLIFIELD. The guard would be subject to immediate call into the Federal service?

Mr. HOEGH. That is right. This is still in the process of development.

I must mention this further: We also have an arrangement with the Army, which is the responsible agency in the Armed Forces for support of civil defense, an arrangement whereby if the primary mission of military would permit the Armed Forces or particularly the Army to be committed in support of the civilian population, it would be such.

Now, we have worked very closely with the Department of Defense for the past 2½ years that I have been here, with this in mind: It is good to have that second capability, what we call the secondary mission, to come in and support local government. But the forces must be trained since they have the capability.

Now, working with them, they have perfected a field manual known as FM20–10, which sets out the civil defense services that the military must be able to render. That is most important. And more training will be done by the military in the civil defense mission. So that if the primary mission is such that they can be released for the secondary mission, they would have a capability of performing.

Mr. RIEHLMAN. Governor, you refer to the National Guard having 21 divisions that would be available for civil defense activities.

Mr. HOEGH. Yes, sir.

Mr. RIEHLMAN. Whatever the number is would they be subject to direction under the civil defense——

Mr. HOEGH. The Governor is responsible in the State of New York, in the State of California, and in all States. The Governor has the responsibility for civil defense and for the protection of people. The Governor has a chief of staff for nonmilitary defense just like the President does. He is the civil defense director of that State. He should be a man of real quality, a man who can really coordinate this total effort.

Now, the Governor is the overall commander, just like the President is, and he has these forces, initially, you see. He can commit them as he can commit all the personnel of the State government, and the resources and facilities therein.

Mr. RIEHLMAN. Would that take away the direction from the Federal side?

Mr. HOEGH. We always retain the right to federalize the guard. We always retain that.

For instance, let us suppose there was an attack and we found that Iowa was not hit. We have a very good division in Iowa. Illinois was hit. Illinois had to have additional support. In that instance we would work with the Governor of Iowa and urge that we be permitted, and even if he would not give us permission, of course, we could federalize the National Guard in Iowa and direct it to go in and support the people of Illinois. We hold that back, and I think it is most important to have that flexibility.

Mr. RIEHLMAN. So you would have direction from the Federal level?

Mr. HOEGH. Yes, but I am a strong advocate of this, Congressman Riehlman, I am a strong advocate that the Governor needs an additional force, in uniform, capable of rendering assistance to people immediately, to augment the many services within the local governments and the State governments, to go in and cope with this crisis.

I am a strong advocate that the Governor have it, and I will take it away from him with great reluctance. As a matter of fact, when I served on the Governor's Committee for Civil Defense, that was one of the strongest proposals I could make and I still believe it.

Mr. RIEHLMAN. One other question: In respect to your program to use the Reserve units throughout the Nation, you explained to us in some degree your arrangement with the Department of Defense with respect to Reserve units.

Mr. HOEGH. Yes.

Mr. RIEHLMAN. I have been very much interested in using our Reserve units. In fact, I introduced legislation that we use the Reserve for this purpose and train them specifically for civil defense activities, and I am much interested to know whether or not we are going to have that type of coordination and working agreement between the Defense Department and the civil defense program.

Mr. HOEGH. We are working very closely with the Department of Defense toward that end. I hope that will be accomplished very shortly.

NATIONAL WATER PLAN

Mrs. GRIFFITHS. Mr. Chairman, if the witness has gone over this material I apologize for not having been here, but I notice on page 12, this highlights of the Department of Health, Education, and Welfare, you show a current budget funds allocated, $2 million, and 158 positions. Under the activities of the health mobilization program, No. 3, you show planning and implementation of a national emergency water supply plant.

Specifically, since I assume it would be the responsibility of the Federal Government, how are you planning on supplying water to the District of Columbia in a case of an attack?

Mr. HOEGH. Well, first of all, I want to explain the Department of Health, Education, and Welfare's role.

Prior to about 2 years ago these funds were normally in its budgets. About 2 years ago the Congress asked us to delete any funds for respective agencies that were used to finance in any way civil defense and defense mobilization, and we were directed to incorporate it under one budget. That explains the reason that we do provide funds for these delegated agencies like the Department of Health, Education, and Welfare.

Secondly, it has the overall responsibility—working with Interior—for the development of the national water plan, which has been developed.

Mrs. GRIFFITHS. There is a plan?

Mr. HOEGH. Yes, a national water plan. That in turn goes to the respective States throughout the country.

The Department of Health, Education, and Welfare, working with an arm of the Governor, the health commissioner and the health department assists them in developing their water plan. In this instance the Department of Health, Education, and Welfare would work with the Commissioners of the District of Columbia.

Here, while it is not recognized as a State, yet we consider it for civil defense planning as such an entity.

That plan then is put into effect in the District of Columbia through the Civil Defense director, who, I may point out at this time, has an inadequate staff because the Congress has not provided it sufficient funds to carry out its responsibilities. I understand that they are being increased this year. The Civil Defense director and the Health Department of this city developed the water plan for this community in line with the overall direction of the Department of Health, Education, and Welfare. Specifically, what it is in the District I would not know. I would say that the person in the Department of Health, Education, and Welfare, who has been assigned to this particular district, would know the specific details. But its objective is to make sure that noncontaminated water, or rather, that that water would be decontaminated so it would be usable.

Secondly, they would urge every citizen in this District to have a 2 weeks' supply of water and juices for their own consumption. If they fail in that, they might never have access to the water that this community would be able to offer.

It takes a time after a community has been attacked for people to go in and render a decontamination service.

Now, if power were still in existence, and your purification system was still in being, then, of course, it would be usable at the time, but the trouble is the power may be out and your chlorination system may be nonexistent.

Those are the things that have to be developed with the local government in the overall planning and direction of HEW.

Mrs. GRIFFITHS. I would think in the capital city of the free world we should have a plan and there should be a request in here for sufficient money to implement it.

Mr. HOEGH. That is a very good point. I want to point out to you that until about 6 months ago the plan was only in the formative stage. The overall plan for the District of Columbia and the complex metropolitan area has been perfected. It is a good, sound, effective plan, but it is only as good as the Government implements, and that means that Congress provides the funds to do it and, secondly, that people take action.

Now, this plan has been disseminated to every person and every resident of this great complex area.

To perfect the plan we had to coordinate it with three States. The District, Maryland, and Virginia, and we had to coordinate it with seven other separate entities of government. It took a tremendous amount of hard work to accomplish it. It has been accomplished. It is a sound plan.

Mrs. GRIFFITHS. It has been disseminated to every person in the area?

Mr. HOEGH. If you haven't got one they are available either at our office or the District office, or at these local Government offices.

I might mention when the plan was issued the news story ran about 1 inch in the classified ad section, and yet it is the most important document for the protection of people that has ever been issued in the capital city of America.

DEPENDENCE OF WATER PLAN ON SHELTER PROGRAM

Mrs. GRIFFITHS. Does it contemplate a shelter system, may I ask?
Mr. HOEGH. Yes.
Mrs. GRIFFITHS. Who is building the shelter system?
Mr. HOEGH. The individual citizen.
Mrs. GRIFFITHS. How many of them are being built?

ESTIMATE OF SHELTER FOR 25 PERCENT OF POPULATION

Mr. HOEGH. Well, as I mentioned yesterday to the chairman and the members of this committee, our estimate is, as of today, that there are shelter spaces with adequate fallout protection for over 25 percent of the people of America. As of today.

For instance, in talking with Governor Rockefeller of New York, his own staff's estimate in the State of New York is that there are five million shelter spaces with adequate fallout protection in that one State alone.

Mr. HOLIFIELD. Of course, the word "adequate" is the key to this, and the shelters that are spoken of are the houses and the basements that do now exist. Any scientific evaluation will indicate that they are not adequate, in spite of what the governor says.

Mr. HOEGH. Let me give an example. In Battle Creek, Mich., we have an old sanitarium that we occupy as our office. Between the 2d and the 12th floors there are adequate fallout protection spaces. That not only has been proven by actually using a live source there and testing it, but that has been further proved by our tests in Nevada, by Technical Operations, Inc., and by other research projects we have carried out.

For instance, in Tulsa, Okla., we have completed a survey. This we found in the commercial areas, 19,000 people occupy that area approximately at nighttime. In the daytime the population of that commercial area is 73,500. Right today there are adequate fallout shelter protection spaces for 69,300 people.

Mrs. GRIFFITHS. Governor, if all of this is true why are we struggling with stopping nuclear testing?

Mr. HOEGH. Why are we?

Mrs. GRIFFITHS. Yes.

Mr. HOEGH. Well, that isn't any of my direct business, but certainly our heads of Government I think are wise in examining whether or not it is the proper thing to do. That is my only comment on it.

Mr. HOLIFIELD. You may proceed with your summary, Governor.

Mr. HOEGH. Congress has authorized substantial funds for Public Law 85–606. However, to date, Congress has failed to appropriate funds to implement this law. I am hopeful it will provide the funds this year.

NATIONAL CIVIL DEFENSE PLAN

Enactment of Public Law 85–606 made it possible to issue and make effective the national plan for civil defense and defense mobilization. This plan was promulgated by President Eisenhower in October 1958.

In reviewing where we stand in preparation for recovery from possible enemy attack, I intend to base my remarks on the requirements and procedures outlined in the national plan. I think you are all acquainted with that document. But it would be useful at this point to mention what it is and why it exists.

First of all, it is a basic plan, pulling together all the fundamental policies, responsibilities, and procedures that make up the foundation for operating plans and detailed action measures. The annexes and their appendixes provide these details. All of these—the plan and its subordinate documents—encompass the whole of civil defense and defense mobilization plans and operations.

I think yesterday I revealed to you what the contents of the plan generally were, and the reason for it. Again, I say that it is a national plan, concerning all governments, Federal, State, and local. Most important, it is a plan by them as well as for them, a cooperative effort by OCDM, other Federal agencies, and State and local governments.

For instance, we work with Governors, county commissioners, other Federal agencies in the development of this total national plan. It is a cooperative effort by all governments.

Why the plan? Because it was a practical necessity. It clearly sets forth the mission and step by step how this mission is to be accomplished, and by whom. At a previous hearing I presented the plan to you in greater detail.

MISSION

As stated in the national plan, the mission of civil defense and defense mobilization is: (1) Protection of life and property by preparing for and carrying out nonmilitary functions to prevent, minimize, repair, and recover from injury and damage, and (2) mobilization and management of resources and production. The plan makes it clear that these are not ends in themselves, but part of the overall defense objective of, first, deterrence, or, if that fails, recovery and victory.

FEDERAL LEADERSHIP

Mr. ROBACK. Do you believe it is necessary to have these Federal funds so you will have some measure of control over these local organizations, because obviously as separate sovereignties now you have no way of influencing in any systematic way what they do.

Mr. HOEGH. It is primarily geared for proper coordination and direction.

Mr. ROBACK. It would give you leverage. If you can dispense, you can withhold, so it would give you some means of organizing in a more systematic way.

Mr. HOEGH. I would have no hesitancy if they did not make their plans jell with the total national effort, I would have no hesitancy to withdraw the funds.

Mr. ROBACK. Let us take the situation in New York. Governor Rockefeller was ostensibly, and I think explicitly, trying to effect some responsibility which was put on him under the national plan.

Mr. HOEGH. That is right, sir.

Mr. ROBACK. Now, that responsibility he didn't owe to the Federal Government as an obligation, but he tried to cooperate, and his legislature wouldn't cooperate with him, so he dropped the idea.

Mr. HOEGH. No.

Mr. ROBACK. Well, he dropped the idea that he proposed to the legislature. There is no doubt about that. He merely said "We will hold up on this thing."

Mr. HOEGH. Now, you are talking about the mandatory phase, but I did outline to you yesterday his proposal that went to the legislature. This is the only proposal that has gone to the legislature in New York, and I hope that it will be adopted because it is a sound program and it is in line with the national policy.

Mr. ROBACK. Suppose that the State had access to some millions of Government funds which they will get or would get under the contemplated implementation of Public Law 606, could you have exercised the leverage of withdrawal or withholding of those funds to try to persuade the legislature to act in a case like this?

Mr. HOEGH. Well, I have never found in my dealings with Governors that that would be necessary. I have found them most cooperative and most willing to assume their just share of the responsibility.

Mr. ROBACK. There is no question that they have good will. The question is, how to get the job done.

Mr. HOEGH. I don't worry about that. If we get the funds to implement 85–606 it will be done better.

Mr. ROBACK. Would you consider withdrawing the funds if the State legislature refused to act on what the Governor represented as the national plan?

Mr. HOEGH. I don't think that would be within my province.

If we don't deter, the goal of national recovery and victory could still be achieved. To recover and win we must first survive. A complete report on recovery must include survival measures. What we do before, during, and immediately after attack is as much a part of recovery as what we do in the days and months after the smoke clears. All civil defense and defense mobilization activities is the need for every individual, every organization, every institution, every industry, every government unit to know their responsibilities and to be organized and prepared to carry them out effectively.

The national plan makes these responsibilities and organizations clear. It has been accepted by the Federal Establishment, and by the State and local governments. It is the model for all civil defense and defense mobilization plans.

DELEGATED FUNCTIONS

The idea of "government in emergency"—that civil defense and defense mobilization is the job of all of government at all levels—is not only recognized as sound, but has been put into practice throughout the Nation. National plan annexes 3, organization, and 4, authorities, set the stage. The competence and resources of other Federal agencies are now being used for nonmilitary defense preparations with coordination by OCDM.

Later on in my testimony I will furnish specific information concerning each Federal agency's assignment, the number of persons engaged in carrying it out, funds appropriated or allocated for the assigned task, and achievements to date.

Mr. ROBACK. Governor, when was the first time that your agency was responsible for making funds directly available?

M. HOEGH. Mr. Gray was the head of ODM, and I was head of FCDA and Mr. Brundage was Director of the Bureau of the Budget. We were called over, I believe, in January or February 1958, where we met with some of the leaders. At that time we were directed to have all of these agencies that now have funds for civil defense and defense mobilization functions within the regular budgets, deleted from the regular budgets, and then have us put them in, in one lump.

That was done partially, then, for the fiscal year 1959. For fiscal year 1960 that was put in, in compliance with requests of Congress. It has again been put in that way for fiscal year 1961.

Mr. ROBACK. Do you get a specific appropriation earmarked for the delegated functions?

Mr. HOEGH. Yes, sir.

Mr. ROBACK. And if you don't get it, you can not dispense it; is that right?

Mr. HOEGH. If we don't get it, they can't carry on these normal responsibilities that they have and I want to add this, that many of these functions that they render are every-day functions; take BDSA. Of course they must constantly keep aware of the production capability, the location of these industries. Not only for today, but in case the chips are down. And that operation should continue regardless of what is earmarked as civil defense and defense mobilization, or just for normal operation. And yet we had to pull them out of their budget and then we had to in turn submit it.

Mr. ROBACK. Did you allocate funds under that procedure in fiscal 1959?

Mr. HOEGH. No, in 1960.

Mr. ROBACK. In 1960 for the first time?

Mr. HOEGH. I did allocate a little—they gave us a half million dollars in fiscal year 1959. Most of the agencies retained their normal budgets at that time. However, one agency, ICC, was just left out completely.

REDUCTION IN VULNERABILITY

Mr. HOLIFIELD. You delegated authority to different agencies 2 years ago. We went into that rather thoroughly and we found out, for instance, that the Housing and Home Finance Agensy had been given the vulnerability problem, the reduction of urban vulnerability, and I think they had one man and one secretary at a total cost of about $16,500 or something like that, to perform their function. So we naturally considered there wasn't much of a function there.

Mr. HOEGH. I can tell you that the reduction in vulnerability has been greatly improved in the last 2 years, and I submit in the record a statement pertaining to it. I could outline in detail what we have done in it, but as I understand you prefer I would introduce the details. I would be happy to go through that with you.

Mr. HOLIFIELD. How many people do you have directly assigned to that problem at the present time?

Mr. HOEGH. Within my own office, I would say probably two people, but we only coordinate the total national effort and we rely upon not only HHFA but we rely also upon BDSA.

Mr. HOLIFIELD. How many people in HHFA are assigned directly to this project?

Mr. HOEGH. I think what I should do is probably read my statement here. Reduction in vulnerability. Is that the one that you are interested in? "Reduction of Vulnerability" is the one following "Protection from Weapons Effects."

Mr. ROBACK. What comes under that heading, now? In the old days it was an effort to disperse industry. Is it now a shelter program?

Mr. HOEGH. It is both.

For instance, we work with BDSA, HHFA, the Department of Defense, Commerce, and the Department of Agriculture, and others, toward better dispersion of industry. That is reduction of vulnerability.

Secondly, toward strengthening their existing facilities to provide shelter for their employees.

Mr. HOLIFIELD. It is not concentrated in the Housing Agency.

Mr. HOEGH. No. It has a role, but it is a very minor role.

INDIVIDUAL REPONSIBILITY

Mrs. GRIFFITHS. In the last analysis, is this civil defense, whether or not we survive, going to depend upon whether or not you, yourself, have read and have taken all precautions for that survival?

Mr. HOEGH. Well, I would say this, that it is more important that the Director knows every detail of the national plan and that he knows the overall objective, and that he attains that objective.

Mrs. GRIFFITHS. For each individual American, your only chance to survive is going to be if you, yourself, have taken the precautions to see that you survive?

Mr. HOEGH. No, no, no.

Mrs. GRIFFITHS. Well, who else is going to?

Mr. HOEGH. I outlined it just a few minutes ago, Mrs. Griffiths—it is like your military defense: The President of the United States is responsible for it. The same is true for military defense. The same is true for a Governor. The same is true for a mayor. The chairman of the county commissioners, or the Commissioners of the District of Columbia.

Mrs. GRIFFITHS. Let me interrupt you: In a war if we are attacked there is a plan and there are armies and air forces and navies that will go into action, under direction. You are not going to rely upon every man to fight off the enemy alone. But in this plan for civil defense aren't you, in the last analysis, absolutely on your own? From what you tell me, you need 2 gallons of water, or 2 weeks' supply in the basement, or juices, or whatever. Aren't you really saying that if you are to survive you must make your own plan?

Mr. HOEGH. This is the nuclear age. We are thinking about a war on continental America. In Europe during World War II there we found Germans who were being assaulted—citizens. They were di-

rected by their local governments, but initially they were on their own. In case of an assault, you get back to the everyday experience of being in a hurricane or in a tornado, or a cyclone. When a cyclone strikes you have governments backing you up, yes, but initially you are on your own. You are on your own. Maybe for a week, maybe for 2 weeks. Until what? Until government can pick itself up. Not just the Federal, not just the State, but the local government.

The medical services of that local government with a coordinated plan and with action can go in and render you a service. But with the horrible effects of the nuclear weapon, the fallout would be a hazard. The doctor cannot come to you initially because he would die in his boots. Initially, you have to be in shelter to protect yourself. You are on your own, and we urge you not just to have food and water, we urge that you have a medical supply, a first-aid kit, so that if you have your normal illnesses you can take care of it, or if you get other injuries you can take of them.

That is true in just the recent experience in Morocco. My man who went there has just returned. There we found that people who were covered up and were helpless, they were on their own initially. Government was trying to get in, but it didn't have this nuclear effect to be bothered with. It could operate quickly, it could respond immediately. And yet there were people. This last man and child who came out—the 12th day—they were in a grocery store when this earthquake hit. They were down in the basement. The grocery man was killed, but they were down in one little corner of the basement. Fortunately there was food and juices stored there. They were able to sustain themselves. As a matter of fact, when rescuers got there and finally dug down there, the little boy, or little girl, handed him up a Coke and said "You are hot. You need this."

But they have the food and the water. Yet the Government couldn't have gotten in there. The military couldn't have gotten in there. You are on your own initially. You have to have the capability. You are a soldier when this country is assaulted.

Mrs. GRIFFITHS. If your only chance is going to be a shelter down in the basement or in a hall some place, we better build a shelter.

Mr. HOEGH. I built a shelter for $212. That is the cheapest insurance I ever bought. That protects me and my family. I want to live. I want my family to live.

DISPERSAL OF INDUSTRY

Mr. HOLIFIELD. I have just been looking at your reduction of vulnerability statement, and I notice that "dispersal," as defined in annex 2 of the national plan, is employment of distance as a defense by creating a multiplicity of scattered targets thus reducing overall vulnerability.

A few kinds of facilities can be scattered without reducing their usefulness and value in peacetime.

Then follow several pages describing how you could get reduction in vulnerability by dispersal.

On page 3 of your statement you say:

Dispersion was also one of the factors considered in granting rapid tax amortization, because of the Defense Production Act. This tax benefit expired December 31, 1959. Consequently, dispersion now occurs when it is of business advantage to the corporation without regard to tax benefit.

That means there is no active program of dispersion.

On page 4 of your statement:

> The Federal Government has the responsibility of carrying out the national policy of dispersal in locating new or major expansions of essential facilities in accordance with defense mobilization order I–19.

Page 5 of your statement:

> The objective of industrial dispersal can only be achieved when industrial and economic factors contribute to this purpose. To a significant extent, the development and growth of the economy itself results in considerable dispersal. New plants are located in new or outlying areas on the basis of normal economic advantages resulting from access to raw materials, labor supply, and new and expanding markets. In this connection the Department of Agriculture is interested in increasing the opportunities for the farm population to secure employment to augment farm income. There is a continued trend of maximum growth in the West and South. This causes a continuing diffusion of industry throughout the United States, resulting in reduced vulnerability to attack.
>
> That such dispersion is economically interesting to industry is evidenced by the fact that during calendar 1959 the Office of Area Development of the Department of Commerce had 124 requests for dispersion advice.

It indicates a desirable goal but there is no program here.

Mr. HOEGH. Yes, we work closely with industries.

Mr. HOLIFIELD. You work closely, but there is no dispersal, from a standpoint of national defense. Dispersal is done on an economic basis, and industries will not disperse unless they are economically justified. I am not criticizing industry.

Mr. HOEGH. I admit, Mr. Chairman, that, for instance, management will continue to manage this industry only so long as they have profits and they show some results. I recognize that.

But let me point out, most people in the Nation think of Iowa as the great farm State, and it is. It is the No. 1. But do you realize that while our agricultural production there is $2¼ billion, our industrial output in Iowa, the great farm State, is $4½ billion? Double.

How did that come about? We have worked with industry. Your development commissions in the respective States, they are constantly trying to get industry to decentralize and move out. Today we have 21 of the world's largest industries within the State of Iowa, including Alcoa, at Davenport, Iowa; including Sheaffer Pen; including Maytag. A great industry at Newton, Iowa.

There is great decentralization going on, and it is going on only because they find that it is good to get out into the marketplace. But many industries cannot go to the marketplace but have to be where the source of supply of their materials is located.

Mr. HOLIFIELD. We can argue all day about whether this is dispersion, or natural growth. I don't know of any State in the Union, with the exception of one or two, that is not growing industrially. They are all growing, and the population is growing. It has increased about 20 million people in the last 10 years and, of course, you are going to have this growth. But this doesn't relate to a civil defense program.

I am just analyzing it.

Mr. HOEGH. The thing is, we are interested in dispersal and we are urging it.

Mr. HOLIFIELD. There has been no dispersal. There has been new growth. There have been none of your great industrial centers that

have decreased. In other words, it isn't the taking of an industry from one place and putting it in another, because your great industrial centers are growing also.

Mr. HOEGH. It is more the new additions, the enlargements.

Mr. ROBACK. Dispersal policy that was of some interest years ago is dead?

Mr. HOEGH. No, sir.

Mr. ROBACK. Nobody gives industry incentives for that?

Mr. HOEGH. We are still desirous to have dispersal. I think it is good for the productive and recovery phase of an assault. It is important. We urge it.

Mr. HOLIFIELD. Proceed with your summary, Governor.

Mr. HOEGH. I don't want to frighten you with all this voluminous information.

Mr. HOLIFIELD. I am not surprised, in view of the voluminous statement that you give—any organization that can produce 40 or 50 million pamphlets on a subject, can certainly produce a voluminous statement.

Mr. HOEGH. That is correct.

I might state this: May I offer the whole into the record, sir?

Mr. HOLIFIELD. It has already been accepted for the files. Your chairman accepted it this morning, and that is why we are asking you to summarize it.

Mr. HOEGH. Now, let me cover just a few of these recovery actions that you have to take care of beforehand, and what we expect of them after the chips are down.

CONTINUITY OF GOVERNMENT

One is continuity of Government. It is most important that Government have a capability of leading, directing, and serving people in case of an attack. Therefore, we are urging the Federal Government, State and local governments, to adopt a four point program. One is the lines of succession for key personnel, preservation of essential records, alternate sites for Government operations, and for full use of all personnel, resources, facilities, and equipment, in rendering support to civilians in the case of an attack.

Now, within the Federal Government this has been complied with and is in effect. For instance, as you know, there are 12 lines of succession. With reference to the Senate, it can be by appointment of the Governor, or his successor. In the House, however, there is not that same line of succession permitted. It is necessary today in most instances to have an election and, therefore, we are strongly urging the House to adopt the Celler resolution, and this would permit lines of succession to be established in case there were 50 percent vacancies. It provides for filling vacancies in the House of Representatives whenever the vacancies reach one more than half of the membership. This is now before the House. It is known as House Joint Resolution 8.

Mr. HOLIFIELD. I think that it is a good resolution and there should be some action on it.

ALTERNATE SITES OF GOVERNMENT

Mr. HOEGH. Now with reference to lines of succession—with reference to alternate control sites, we have good alternate control centers for the Federal Government. One that will accommodate 2,500 of the leading personnel in the field of emergency service. Communications are the best in the world. We have the everyday capability. We keep a skeleton staff of the Federal Government in that location so that we never can lose the access or the use of this control center.

The preservation of records is well advanced in the Federal Government. A a matter of fact, 106 agencies have completed the preservation of their essential records, except that they need to keep them current.

Mr. ROBACK. Is there a hardened location where these skeleton staffs are located?

Mr. HOEGH. Yes. Where we go, plus key officials that have emergency responsibilities.

Now, also, we are asking the Congress to give us funds in the amount of $3,800,000 to procure more relocation sites to protect personnel of the Federal Government. There are to be 17 sites located outside of Washington. That has not yet been accomplished, but we have the capability for national coordinated direction from our present control center. There are other sites but this is the principal one pertaining to nonmilitary defense.

Then in connection with the full use of all personnel resources and facilities, that has been well developed within the Federal Government.

Now, with reference to the State and local governments, we have worked with them and with the council of State Governments to develop a legislative program, to make these actions possible. It is most interesting to find in many States and local communities that you can't relocate your government outside of a city. By constitution in some instances it is required that the capital has to be in a certain place. So it has been necessary to come up with a package of legislation. That has been developed with State and local governments, and last year it was introduced in 42 of the State legislatures that met. Thirty-five of the States took affirmative action on part or all of this continuity-of-government program, which I think is probably the best accomplishment that has ever been made in one session of legislatures by any proposed Federal legislation.

Mr. ROBACK. Is that a problem akin to the national requirement that agencies be located at the seat of government?

Mr. HOEGH. That is one. Another one is the lines of succession for key personnel.

Mr. ROBACK. How do you overcome the national legislative requirement about seat of government, as far as the Federal agency is concerned?

Mr. HOEGH. We are within the law on that, and within the Constitution. Sometimes legislative action is required and the States amend the acts to provide that they can go out and establish a seat of government at an alternative control center. We have worked with State and local governments toward this end. It has been fully endorsed by all governments at all levels.

I would say that the results have been excellent.

REGIONAL CONTROL CENTERS

I might mention further that we are establishing regional control centers. These control centers will be used every day as well as in the case of an attack. These are underground control centers. They have a minimum of 30 pounds per square inch, and also adequate fallout protection. These will house not only the OCDM staff and executive reservists that might be called in to complement that staff, but also to house other Federal agencies, so that we will have eight regional offices of Federal officials to help coordinate and direct, because we recognize in case of an assault communications could be knocked out. We could lose control, even at our protected site, and therefore we must have a capability at eight different places throughout the country to carry it on, and they have been earmarked as to which one takes over first, if it can sustain national direction, and then if it cannot then the regions would operate within themselves. But if they are—and they are well interconnected today, except that we have only one underground that is now in the process of construction. That is all we asked for initially, and it is to be built at our regional office in Denton, Tex. It will accommodate for everyday operation 150 people, and when the chips are down it will accommodate 500 people.

Mr. ROBACK. Does this require building new structures completely?

Mr. HOEGH. We do it that way. We get out of target cities, we go underground. We are going to use it for everyday operation.

Mr. ROBACK. What is the building schedule for your eight regions?

Mr. HOEGH. I want to see this first one, I want to test it, I want to make sure it is right. It is based upon others that I have seen in foreign countries, and also those that we have worked on.

Mr. RIEHLMAN. The first one is located where?

Mr. HOEGH. Denton, Tex.

Mr. HOLIFIELD. Where is that?

Mr. HOEGH. It is half way between Dallas and Fort Worth, a little bit to the north.

First, you must have this strengthening of government at every level capable to render service. That has to be done.

Again, I point out, Public Law 85–606 funds are important. The $12 million are critically needed, in order that civil defense can be strengthened at that State and local level.

I know, Mr. Chairman, that you are in full accord with it, and we appreciate that kind of support.

COMMUNICATIONS

Now, it is also important that we are able to warn people of an attack. This must be a capability that is of the best. Our people, OCDM officials, sit with NORAD and is now starting to sit with SAGE divisions. There we have simultaneous access to the same information as the military. When an enemy attack either by air or missile is detected our people know it at the same time as the military. We then can immediately notify as of today 376 critical points throughout this Nation and we can do it within 15 seconds. We give them not only the information that this is an attack, and the type of

it, but also, leaning on the military, we give intelligence information as to the approximate times it would hit certain areas.

Now, in addition to that, the Federal Government matches funds with State and local governments to strengthen their capability of taking the warning from these points to which we disseminate, and in turn disseminate it to all of their communities within their jurisdiction, and then they in turn disseminate it to the people.

Now, we have tested this on several occasions. I believe that New York State probably is one of the most effective in the country, and their last test showed that all sirens had been sounded within 2 minutes and 30 seconds after we first detected the attack.

Now, sometimes we have found in some communities it has taken as long as 20 minutes. That does not satisfy us, and we are constantly trying to strengthen that at the State and local level so that information can be gotten to the people much more quickly.

Mr. HOLIFIELD. Our Air Defense Command is in Colorado, and it funnels out from there?

Mr. HOEGH. Yes, sir; through our communications network.

Now, I would say that we probably today have one of the most effective warning systems in the world. I am still working toward improving it, particularly at the State and local level. And ultimately we are going to give this warning to 500 critical points and our schedule for that is to have it completed by July 1962, providing we get the funds.

EFFECT OF SAGE REDUCTION

Mr. HOLIFIELD. How does this recent curtailment of the SAGE system that has been just announced in the last week affect your capabilities?

Mr. HOEGH. That will not affect us, Mr. Chairman, because we will stay with the military installation that has the responsibility of detecting the attack, and we stay right with them.

Mr. HOLIFIELD. But this has been withdrawn on the basis that it is no longer up to date, that it is obsolete; is that not so?

Mr. HOEGH. I don't know about that—what do you mean? With reference to what?

Mr. HOLIFIELD. The announcement which came out last week about the reduction of the SAGE system function.

Mr. ROBACK. I believe the reference in the paper was to a project to construct hardened combat centers. Also there is a problem of completing the program, which presumably has been held up. Most of this information I think is classified. Therefore, it is hard to determine from newspaper stories exactly what is afoot.

SAGE has various centers. Do you have a man stationed at the different computing centers?

Mr. HOEGH. I have them where I need to have them in order to cover the complete area of the United States.

Mr. ROBACK. What is his function, in warning, in damage assessment, or what?

Mr. HOEGH. I have more than one. I have six men in each air defense command. They have to be on duty around the clock.

Mr. ROBACK. What does your SAGE man do as far as civil defense is concerned?

Mr. HOEGH. We sit right with the commander, or his representative, and there is one there 24 hours of the day and our people are right there. If it is revealed, with the radar system and with their other systems, that there is some unfamiliar plane, unrecognized plane in the air, or if they would see some missiles, when they get that capability, coming into the air, the commander would then say "Find out about that," and soon he would discover that this is an attack. And when he says that this is an attack, my man picks up and communicates with the 376 critical points, right then. But he has to wait and I have instructed him to wait until the commander has said "This is an enemy attack."

Mr. HOLIFIELD. It is a military determination that it is an attack, and it is your man's function to spread the warning?

Mr. HOEGH. That is right.

Mr. HOLIFIELD. He depends upon the regular communications lines for that, does he?

Mr. HOEGH. Yes, sir; he can at that time.

Mr. ROBACK. Do you have a telephone bill that you pay separate from the SAGE operators?

Mr. HOEGH. I do in the national warning system to each of these 376 critical points.

Mr. ROBACK. Do you have special circuits?

Mr. HOEGH. Oh, yes.

Mr. ROBACK. Leased lines?

Mr. HOEGH. Yes, sir. We don't have them ourselves. They are under leased arrangements which is the most economical arrangement.

Mr. ROBACK. Are those lines hardened?

Mr. HOEGH. They are. For instance, all of my communications net will bypass critical target cities. Every one of them. I have to have the best communications net at all times.

Now, we have asked for the funds to do that this year. It costs a little more money to have your communications net arranged for bypassing, but I think it is a good investment. It is a good expenditure.

Mr. ROBACK. You say it will bypass congested and populated areas?

Mr. HOEGH. What we consider target areas.

Mr. ROBACK. Are you wholly dependent on land lines?

Mr. HOEGH. No, sir. My military experience has taught me that you better have some other means of communications. And we have them. We have today, backed up, our telephone and teletype communications net, with radio to regions, and by the end of this year, to 22 of the States. The most critical States.

If I get the funds I have requested they will be in all 50 States. Our radio communications are the finest. They are the most advanced type of communications.

In addition, we also have the ham operators. We have approximately 2,000 of them coordinated in our national communications system. They are primarily, however, for the use of State and local governments. The State and local governments have excellent communications. The police department, or the State highway patrol. The conservation offices.

You will notice as I point these out, how ridiculous it would be to bypass governments and to have some Federal autonomy set up to

render all of this service. I would be prohibitive in cost. But we are using existing facilities. And then we are permitted to go and match funds to help them strengthen their capability for emergency purposes and we do that at the State and local level. But it is primarily financed by State and local governments.

REGIONAL CONTROL CENTERS

Mr. ROBACK. The chairman's earlier comment regarding SAGE, I think, involved a question as to whether there was a termination of that part of the SAGE program contemplating hardened SAGE centers. If you don't have hardened centers, whatever your communications are, you have trouble.

Mr. HOEGH. Of course the main thing is the detection. And I hope to detect before the bomb hits them. I fully recognize they may hit.

Now, insofar as I am concerned, if I can get this first information and get it transmitted to these points, and they in turn transmit it to people, then SAGE and NORAD have done their job. I would like to get their further intelligent reports, don't misunderstand, and if we can get them we certainly would disseminate it to the public. But the main thing is to get this initial warning off and get it off quickly.

Mr. HOLIFIELD. There is no doubt that you should have these regional centers underground just as quickly as possible for your whole system. To a certain extent we depend upon that for warning, and also it would be very valuable for continuous news dissemination when the regular lines of news dissemination were disrupted. People panic sometimes for lack of knowing what is going on. A facility such as this could at least do something along that line.

Mr. HOEGH. We are pressing real hard for the completion of this one so we can come to the Congress and ask for the additional funds to complete it.

Mr. RIEHLMAN. When is the date of completion on this first one?

Mr. HOEGH. There is an awful lot of red tape. I thought you could cut this stuff, but I find now it is not easy, but I am hoping that it will be finished by a year from now. I am hoping for that. I am pressing real hard.

Mr. HOLIFIELD. It has been started?

Mr. HOEGH. Well, the designs are prepared and I think it will be submitted to contract.

Mr. HOLIFIELD. No actual construction?

Mr. HOEGH. No.

Mr. RIEHLMAN. If that is completed in 1961 what would be the program for the other?

Mr. HOEGH. I would probably come in and ask for a supplemental after I see it and look at it. Find out if it is the right one. I am sure it is, but it is good to test it.

Mr. RIEHLMAN. You would contemplate construction of seven additional in 1962?

Mr. HOEGH. I would probably go half and half. Three, and the the next year, for four. This policy has been approved. This is a matter now of implementation.

STOCKPILE POLICIES

Mr. ROBACK. Governor, can you direct yourself to the problem of stockpiles?

Mr. HOEGH. Yes.

Mr. HOLIFIELD. Will you draw the line between the mobilization and the civil defense stockpiles?

Mr. HOEGH. Yes. We have what is known as the strategic stockpile. It is, of course, the stockpiling of critical materials needed to put industry into production, of vital military and civil products.

Today we have 75 items in the strategic stockpile. And when I say strategic stockpile I also include three or four others.

Our policy is to have such materials on hand that are adequate for normal use for 6 months.

This policy, as you know, started back in the Korean war days. We have filled our strategic stockpile requirements, with the exception of four items which we feel will be completed probably this calendar year.

Mr. HOLIFIELD. You are talking about the civil defense stockpile?

Mr. HOEGH. Strategic only. Just the strategic. We now have what we have found to be some excess of different products; of materials. However, we have a policy that we will not dispose of any of these excesses if they would in any way jeopardize or impair the current market or the industry involved.

Also we would not dispose of it if it would have international effects. Therefore, we have a disposal program but it must meet these requirements.

We would under no circumstances dispose of any materials that we feel are needed to fulfill the objective that I first outlined.

Mr. HOLIFIELD. May I ask how that 6-month supply corresponds with the total supply?

Mr. HOEGH. I would say we have now, generally speaking, in values of dollars, considering all the strategic material stockpiles, a stockpile in the neighborhood of $7 billion, but we have several put contracts still out that were entered into in 1950, 1951, 1952, and later, that we are still obligated to obtain and to fulfill.

Mr. HOLIFIELD. This takes into consideration all the strategic minerals, textiles, and other things like that?

Mr. HOEGH. Yes. And based on the 6-month rule and a 3-year emergency rule, which is also a part of it, we have approximately 50 percent in excess of what we need.

Now, with reference to the stockpile of emergency supplies. Civil defense——

Mr. HOLIFIELD. Before you leave the mobilization stockpile, the original thought on that was to provide us with scarce materials many of which had to be imported, for the waging of a long time war. The general military thinking today is that an all-out war would be of a much shorter period that we have had in years gone by.

In my opinion, this would not lessen the value of these mobilization stockpiles, because the rehabilitation period after a nuclear attack would be equally if not more important than having these materials during wartime. If the war is short and as disastrous as some of the people think who have studied it, this mobilization stockpile, in my

opinion, should be held together in the case of nondeteriorating materials, for the postwar rehabilitative period, even though it is in excess of 6 months' use.

Mr. ROBACK. Mr. Chairman, that raises a question as to whether the stockpile material has that potential value.

Can you tell us, Governor, whether the bulk of that material in inventory has postwar recovery value?

Mr. HOEGH. Yes, sir; we have examined that.

Mr. HOLIFIELD. What are some of the things you have, copper, mica, lead, zinc?

Mr. HOEGH. Cobalt, industrial diamonds, rubies.

Mr. ROBACK. What would cobalt do in postwar recovery?

Mr. HOEGH. We used to have coconut oil. We used them for napalm bombs, but we don't need that any more. We are trying to dispose of it and we are having good results. They had a drought down in the Philippines for a couple of years, and we have a good market for it.

UPGRADING OF RAW MATERIALS

Mr. BREWER. Isn't it a fact that most of these materials are not in a usable state?

Mr. HOEGH. That is right, but they would be fed into industry for their uses. These are critical materials that it would be most difficult to get a supply of if you didn't have them. Many of these are materials we have to import, and we are dependent upon importing. Certainly we should have them accessible so that industry can make use of them as they get back into production.

Mr. ROBACK. But unless you have a program for conversion to finished materials, basically that raw material supply will be useless?

Mr. HOEGH. Well, we have started upgrading some of our materials and putting them more in the line of end products.

Mr. HOLIFIELD. If you had it in ore it would be one thing, but if you had it in, let us say, pig iron, or wrought copper, or plate copper, it would be another. In one instance it would be useful for rehabilitative uses, and in the other instance it would have to be processed before you could use it, and your processing plants might be unavailable.

Mr. HOEGH. We recognize that, but also we recognize the importance of having this material needed and not having to depend upon importation initially.

Mr. BREWER. Have you taken action on the recommendations of the so-called Pettibone report, the report of the Special Stockpile Advisory Committee?

Mr. HOEGH. Yes, sir.

Mr. BREWER. One of their recommendations was:

The committee recommends that in stockpiling emphasis be shifted from raw materials to finished items and vital supplies for survival, relief, and rehabilitation.

And in a supplementary statement a member of that committee, a Mr. Henry H. Fowler, stated:

I feel that the urgency of the situation is sufficiently great and the information already available is sufficiently extensive to warrant decisive action to initiate the program.

Has that program been initiated to convert these materials to a more usable form?

Mr. HOEGH. Some of them have.

STATEMENT OF J. ROY PRICE, ASSISTANT DIRECTOR, OFFICE OF CIVIL AND DEFENSE MOBILIZATION

Mr. PRICE. In most of the metals which we have, the basic types, such as aluminum and copper, they are the refined, finished products. For instance, aluminum pig.

Mr. ROBACK. Do you stockpile bauxite?

Mr. PRICE. Yes, we stockpile bauxite.

Mr. ROBACK. Bauxite has no immediate aluminum value.

Mr. PRICE. Now, we are upgrading constantly. Not in large quantities. Copper is even being further upgraded to produce oxygen-free copper. I have the list of those things we are upgrading.

Mr. HOLIFIELD. What is the magnitude of that program?

Mr. PRICE. Do you mean the upgrading?

Mr. HOLIFIELD. Percentagewise, how much of the raw materials have you processed into a semifinished state?

Mr. PRICE. I would say in metals we have better than 50 percent.

Mr. HOLIFIELD. You have processed 50 percent of the raw ore into pig or copper or plate?

Mr. PRICE. They have been acquired on that basis; yes, sir.

Mr. ROBACK. That is true of aluminum, too?

Mr. PRICE. Yes. It would be more than 50 percent of the aluminum, sir.

Mr. HOEGH. I am familiar with the Pettibone Committee's report. I believe they referred more to the survival items.

Mr. BREWER. They are changing the composition—

Mr. HOEGH. They felt we had reached the maximum in strategic stockpiling, except for the contracts that are still coming to us, but then they also urged we make our calculation and survey of the needs of additional survival items that should be stockpiled.

Take, for instance, today, we have in our stockpiles engineering equipment of the approximate value of about $8 million, this is pipe, generators, chlorinators, water purifiers, and that type of equipment. Now, that is used by many State and local governments in the case of a national disaster.

MEDICAL STOCKPILE

We are in the process now of working with HEW and the Department of the Interior, in determining how much of this material we need, other than what we have on hand. In addition, we have today a medical stockpile in excess of $200 million. It is in the neighborhood of $212 million or $213 million.

Mr. BREWER. How does that compare with your objective?

Mr. HOEGH. The Department of Health, Education, and Welfare, our office, and the American Medical Association, are refining the needs or determining the needs, in case of the different types of attack on this country.

Dealing, now, with a nuclear attack, what shortages would there be.

Now, we are in the process with the Department of Commerce of determining what does—and also HEW—the average citizen have in his home. Does he have a first-aid kit. What kind? How much. Next, what do we have on the shelf of the retailer, the drugstore, etc.; and now the grocery stores, also. What do we have in the wholesaler's place of business? What can we obtain from the military that might be in excess to their demands, if it is an excess. This is all being completed, and when the deficiency is determined, after taking into consideration these factors, then we will come to the Congress and request additional funds to implement it or increase it to the extent we feel would meet this objective.

MEDICAL STOCKPILE OBJECTIVE

Mr. BREWER. Haven't you already established an objective?

Mr. HOEGH. We have an objective. We have to be capable of supplying medical stocks, medical survival items for a 6 months' period, because it would be that long at least before industry could get back into the production of these critical items.

Mr. BREWER. Is this a change in your objective to have medical supplies to take care of 5 million casualties for a period of 21 days?

Mr. HOEGH. Yes, sir. That is finished.

Mr. BREWER. What percent of that objective was met by your $200 million medical stockpile?

Mr. HOEGH. The one that we have today, would be adequate, I imagine, for approximately 30 days, based upon what we have tentatively now received in the way of information as to what is in the home, what is on the shelf of the retailer, and the wholesaler, and the producer.

Mr. ROBACK. In other words, you have about reached the stability of your medical stockpile. You are not asking for any buildup?

Mr. HOEGH. It looks like I will. Oh, yes.

Mr. ROBACK. What is the magnitude of your medical stockpile?

Mr. HOEGH. It is now approximately $212 million.

Mr. ROBACK. How much are you asking to build up the stockpile?

Mr. HOEGH. It has not been definitely determined as to how much, but I have said as soon as it has been accurately determined I will come to the Congress and ask for the funds.

Mr. ROBACK. You are not asking for a buildup this year, outside of the replenishment factor?

Mr. HOEGH. No, I have asked for funds to update our current——

Mr. ROBACK. You are talking about the replenishment problem of the drug supply. But outside of that?

Mr. HOEGH. To accumulate new, I have not, that is right, but I intend to as soon as——

Mr. HOLIFIELD. You are not really depending upon the neighborhood druggist's supplies, are you?

Mr. HOEGH. Well, I would certainly think——it is going to be taken into consideration.

Mr. HOLIFIELD. It should be taken into consideration, but certainly you can't depend upon it?

Mr. HOEGH. Yes, you can at the local level, sir, if it is not hit. Now, if it is hit that is something else, but if it isn't hit certainly the local

government will have access—the whole health service—to those supplies, and they should be used for that purpose.

Mr. HOLIFIELD. I know they have to have access to it, but if there is any special radioactivity at all in the area, when the drugstore windows go out, that radiation activity goes into the drugstore and contaminates the chemicals on the shelves.

Mr. HOEGH. Only those that are exposed, sir. Not those that are not exposed, and that, of course, is taken into consideration in making the final determination as to what our ultimate objective is.

Mr. BREWER. Governor, did you not have a $400 million medical stockpile objective at one time, of which the $200 million now stocked represents a half of your objective?

Mr. HOEGH. Yes, but it was not based on what I consider all of the factors that must be considered, and I have withheld asking for it until I make a final determination as to what our ultimate must be, to meet what we estimate to be the deficiencies in case of a nuclear attack.

Now, I do that for this reason: Knowing that the Congress is not going to appropriate any funds unless I can give them that kind of information.

Mr. HOLIFIELD. What kind of information can you give them that you don't now have?

Mr. HOEGH. As soon as I complete this I can come up with a definite figure, and for what I must expend this money in order to meet the deficiencies in medical supplies for serving people the first 6 months until industry can get back into production.

Mr. HOLIFIELD. Isn't it true that you had more difficulty with budget restrictions than program restrictions?

CCC SURPLUS STOCKS

Mr BREWER. Governor Hoegh, what control does OCDM have over the Commodity Credit Corporation surplus stocks?

Mr. HOEGH. Well, we have a working arrangement with the Department of Agriculture and the CCC whereby when there is a need for these foods for the sustaining of people, that we could use these——

Mr. BREWER. Is there any program now contemplated to convert those resources to a more usable item such as the item you mentioned yesterday, the General Mills package for individual survival?

Mr. HOEGH. No, sir; I am in full accord that they should be as they are, unprocessed, but they should be made available to the sustaining of people.

There is nothing wrong with eating corn ground with a little water. It is good. And the same thing is true with wheat. You will do anything in order to sustain yourself. This is an austere program. This is to keep you living. This is to keep America surviving.

Mrs. GRIFFITHS. The first thing you will do is to walk out into the radioactive fallout to find somebody to tell you what to do?

Mr. HOEGH. No, I hope you will read the Washington area plan and you would learn that you should remain in your shelter. We estimate you should stay there for two weeks, Mrs. Griffiths.

Now, through CONELRAD, after the attack is over, and the enemy is knocked out, through normal radio and television—and, therefore, we advocate as an essential part of the shelter a battery radio, with adequate batteries, so that you can gain that information from your local government responsible heads, as to when it is safe to leave your shelter.

Again, it stresses the importance of food, water, and medical supplies to sustain you when you are there.

STRATEGIC STOCKPILE

Mr. BREWER. Returning to the strategic stockpile. Has any study been given to the cost of converting some of our war production type resources in reserve to more readily usable items for recovery operations on a barter basis, or any other way of changing the composition of our total Federal assets in this respect to emphasize the availability of repair equipment, transportation and fuel, in an emergency, and things of that type? Is your agency studying this or considering it at all?

Mr. HOEGH. We use the appropriate Federal agency to make that. For instance, on petroleum, the Department of the Interior. For transportation, we take over all responsiblity on that because there is no separate agency, distinct, on transportation, but we lean heavily on ICC and other areas.

Mr. BREWER. The question was whether you are giving any consideration to changing the composition of the assets. In other words, swapping off certain items of a production type——

Mr. HOEGH. We are constantly evaluating it. The Department of Commerce—all the departments of Government—the Department of Defense; for instance, they will submit to us when they have learned or discovered that they no longer need an item, that is then communicated to us and then after we have disseminated throughout the agencies and have a coordinated action, then that is available for disposal, and then we, of course, as you mention, we have used CCC, under the barter plan. Public Law 480. And many of our farm surpluses have been exchanged for certain critical materials that we feel should be in the critical stockpile.

Mr. BREWER. Are you building up the stockpile of repair equipment and recovery items specifically for civilian recovery?

MACHINE TOOL INVENTORY

Mr. HOEGH. Machine tools, yes. We have a $3 billion inventory of machine tools.

Mr. BREWER. Where are they located, Governor?

Mr. HOEGH. They are located throughout the country.

Mr. BREWER. Are they located in plants that are part of our operating assets, so that if our operating plants are knocked out then we would lose also the reserve machine tools?

Mr. HOEGH. Some of them are with a calculated risk, and some without risk. Some of them are dispersed areas, decentralized areas. Some of them are in congested areas. It is an even balance.

Mr. HOLIFIELD. You speak of some of them being in dispersed areas. What do you mean?

Mr. HOEGH. The Alcoa plant in Davenport would be a decentralized area, or dispersal.

Mrs. GRIFFITHS. Where is the closest missile base?

Mr. HOEGH. I think in that case it would be about 250 miles.

FALLOUT HAZARD

Mr. HOLIFIELD. Have you compared this with the plan to harden bases of the Air Force? You know we are going to take care of the breadbasket area with the hardened bases, from Des Moines on down to Texas. You have a string of hardened bases to take care of the breadbasket for you. If Alcoa is in that area we will take care of that, too.

Mr. HOEGH. But you know, Mr. Chairman, that fallout does decay, and while it may create a hazard there for a week or 10 days, after that period of time it had adequately decayed so that you could go in. I think it is most important that we always keep that in mind, because if you read "On the Beach," and took that thing as being the truth, everyone would give up, but it is far from the truth, as you know, Mr. Chairman. Radioactive fallout decays, and decays by a factor of 10, every multiple of 7. As a general rule you can state that. Therefore, if it is a thousand roentgens in Davenport, the first hour, 7 hours later it is down to 100 roentgens, and 7 times 7, 49 hours, it is down to 10 roentgens, and 7 times 49, the equivalent of 2 weeks, it is down to 1 roentgen, or less.

Mr. HOLIFIELD. This doesn't take into consideration your strontium 90, and your cesium 137 deposits, which will last much longer.

Mr. HOEGH. That is right.

Mr. HOLIFIELD. And there will be areas quarantined in the United States for many months, and perhaps years?

Mr. HOEGH. Mr. Chairman, I think our estimate was 3 percent of the land area of this country would be so highly contaminated at the end of 30 days that we would have to move people out of that area.

Mr. HOLIFIELD. There will be buildings, too. Some of the ships that were in the Bikini explosion, two years later they were still so contaminated—and this was only a 20,000-ton explosion—two years later they were so contaminated people couldn't live on them in spite of this formula of decay.

MULTIPURPOSE FOOD

Mr. HOEGH. Now that we are talking about food, I will just show you this can here. That is the gallon can of processed food that can sustain you for two weeks. One individual.

Mrs. GRIFFITHS. Will the Government supply that?

Mr. HOEGH. No, ma'am; we ask the public to buy it. It is just like aspirin.

Mrs. GRIFFITHS. Is General Mills the only maker?

Mr. HOEGH. No ma'am; there are others, and we are urging every other industry to do the same.

Mr. HOLIFIELD. That sells for about a dollar and a half, you say?

Mr. HOEGH. Yes, sir; but laid down here for a dollar. I bought a case for my own shelter. Six of them. I thought I would have a little extra for my neighbors.

Mr. HOLIFIELD. You expect guests?

Mr. HOEGH. Yes, and it is palatable. I am sorry I didn't bring over the can that is opened.

Mr. HOLIFIELD. I am sorry you didn't bring a can opener. We would all have lunch.

How long is this supposed to last an individual?

Mr. HOEGH. Two weeks, sir.

Mr. HOLIFIELD. One individual, two weeks?

Mr. HOEGH. And they have actually tested just recently in a shelter, as I told you yesterday. A man lived on it, plus vitamin C tablets, plus water, for two weeks.

Mr. ROBACK. What does it taste like? You are an old Army man. What does it taste like?

Mr. HOEGH. It tastes much better than the candy bar they used to give us. You know those hard chocolate bars that broke my teeth.

Mr. ROBACK. That was hard, but that was sweet.

Mr. HOEGH. This is palatable. It is a cross between good Iowa corn and soybeans.

Mr. ROBACK. It tastes better than C-rations?

Mr. HOEGH. Much better, in my opinion.

Mr. RIEHLMAN. Have you actually tried it?

Mr. HOEGH. Yes, sir; I eat a little bit every day. I have a little shaker on my desk and everybody who comes in I say "Hold out your hand," and I put a little of that in and I say "Eat it." I have to eat a little with them. They won't eat it until I do.

There are other industries, and we, of course, hope more of this is produced by all industries who are in this type of work.

Mrs. GRIFFITHS. Will the Government pay for the advertising?

Mr. HOEGH. We don't need to. You would be surprised. I have a little brochure here that they are sending throughout the Nation. Many people are looking at them. It is a good, economical thing to have for an emergency. For instance, four in your family, 10 "bucks."

Mr. ROBACK. Governor Hoegh, that was strictly a company developed product, wasn't it?

Mr. HOEGH. Oh, yes, but they have been working with us. We said, "We need a real convenient"——

Mr. ROBACK. Did OCDM put any money into this?

Mr. HOEGH. We didn't put a nickel into it. We have to do most of ours through salesmanship.

GAS MASK DEVELOPMENT

Mr. ROBACK. Where there is a commercial project, such as the gas mask, how is that manufacturing source determined?

Mr. HOEGH. On the gas mask, of course those have been research projects that we have conducted jointly with the HEW, with the Department of Defense.

Mr. ROBACK. Who gets the manufacturing rights?

Mr. HOEGH. In this instance, all industries that have a capability of producing the mask will have the same access to our blueprints and our specifications.

Mr. ROBACK. Is this a patented article?

Mr. HOEGH. No, sir; it is one that is being developed by Government, and one——

Mr. ROBACK. We are talking about a gas mask that you intend to put out with Government money developing it, and I was asking how the manufacturing rights are determined. Would you tell us a little bit about how many of these gas masks will be produced and distributed according to your specifications?

Mr. HOEGH. Well, I would hope, because of the probable use, or the possible use of the chemical and biological effects, or weapons, that in time every citizen would have this mask that is now under final development. It is a mask that would cost in the neighborhood—from estimates of industry—about $2.50. It is a mask that we consider one of the finest in the world, but we do have to process it further, and I know some of the Scandinavian countries are most anxious to buy our masks because they are effective, and most inexpensive.

MULTIPURPOSE FOOD

Mr. HOLIFIELD. This food is a kind of a meal, is it?

Mr. HOEGH. Yes, sir.

Mr. HOLIFIELD. Does this correspond to the meal that has been developed by this organization called Meals for Millions?

Mr. HOEGH. Yes, sir.

Mr. HOLIFIELD. This is it?

Mr. HOEGH. This is it.

Mr. HOLLIFIELD. I know something about this Meals for Millions group. It is a very vigorous group, the so-called Clifton group in Los Angeles, and I think they pioneered this Meals for Millions idea for the undernourished areas of the world.

It is true that from the standpoint of the necessary nutrients, that you can absolutely depend upon this material. I have talked with doctors in Los Angeles about the material. I didn't know it was the same material.

Mr. HOEGH. Yes, it is.

Mr. HOLIFIELD. It is being used in India extensively to supplement the native diets. This is purely philanthropic, on a people-to-people basis.

WAR DAMAGE INSURANCE

Mr. BREWER. Governor, could you advise the committee of the planning that OCDM may be doing in the way of developing a war damage insurance concept for possible application? Has your agency given consideration to this concept?

Mr. HOEGH. Yes. We work on what is known as a stabilization program. That has, of course, several principles involved. One is that our objective should be to sustain this free economy and that a sound fiscal nation is essential.

Mr. BREWER. In other words, this would be economic controls?

Mr. HOEGH. Yes, but it also—when I said that you have to have a sound fiscal nation, that, of course, brings up the subject matter that you interrogated about. You have to consider, of course, money policies. The Secretary of the Treasury is delegated that overall responsibility. We coordinated, but he has the whole responsibility

of the ordinary leadership role in this policy, this program. He, with the Governor of the Federal Reserve System, the Director of the Bureau of the Budget, the Economic Advisor to the President, and myself, have been working on this for approximately 18 months. We have now issued as a part of the national plan an annex that sets forth the detailed program necessary for stabilization. We have not as yet made a conclusion as to the necessity of war insurance. That, however, is being processed and we hope to make some definite conclusion on it, and it would then be issued as an appendix to the annex dealing with either the necessity or the non-necessity, and if it is the necessity, the methods of indemnifying for war losses. It might be done through war insurance, or it might be done through a charge upon those that did not suffer a loss, and equalization. Those have not as yet been resolved, but those are important matters that must be resolved, and we hope that they will be very shortly.

Mr. BREWER. When do you anticipate a decision on this, in the next year?

Mr. HOEGH. I would hope before the end of this calendar year; yes, sir. And that is one of the most difficult subject matters. I have been with Bernard Baruch on a couple of occasions; I have discussed it with him personally. As a matter of fact, I submitted it to him for his advice and recommendations some of these policies pertaining to the overall stabilization, for at least his opinion, and I tell you that he is most willing and he is rendering a tremendous service by helping us in this field.

But also these other departments are doing a great job. Take, for instance, the Federal Reserve System. It is making tremendous preparedness efforts for the carrying on of fiscal and financial operations after the war, or the attack. Including stockpiling of money, hardening of their banks, having continuity of management assured, preserving essential records that people's rights may be protected. That is having tremendous success.

By the end of this calendar year that whole system will go out to all the banks of America, and I would say by the end of the calendar year we will be greatly strengthened in our banking capability after this war.

EMERGENCY LEGISLATION

Mr. BREWER. Do you contemplate any standby legislation?

Mr. HOEGH. Yes.

Mr. BREWER. You have instructions and regulations that would be put into effect in an emergency, but have you considered standby legislation for enactment by the Congress for application in the event of emergency?

Mr. HOEGH. We have some legislation drafted, but it is not to be introduced until either the attack has hit or extreme tension exists.

Mr. BREWER. Is that available for perusal by the committee?

Mr. HOEGH. I would say probably not. It has been discussed within the executive branch, but it has not been submitted for congressional action.

Mr. BREWER. Do you have some reason for withholding that?

Mr. HOEGH. I don't know all the rules of the Government, and therefore I would have to tell you later as to whether or not you could look at it. Personally, I would have no objection, but I don't know what the policy is in this matter.

Mr. HOLIFIELD. I think that you might investigate it. I doubt if there would be any real reason why the committee couldn't look at this type of legislation. I would ask you to respond to the request later, if you can.

DAMAGE ASSESSMENT

Mr. HOEGH. With regard to damage assessment you need to know after attack what you have left, and where it is. I think we have a wonderful capability in this field. As you know, we have a computer at our relocation center. We have, through Commerce and through other Federal agencies, on tape, these resources, where they are and in what quantities. We use them in test exercises. For instance, I think we obtained some information for you, Mr. Chairman, and your committee.

Mr. HOLIFIELD. Your organization has been very helpful to the Atomic Energy Committee.

Mr. HOEGH. We put this information through our computers. That is constantly in operation. Not only our personnel, but other essential Federal agencies like Defense, Commerce, Interior, and all of those who have information pertaining to resources: Where they are located, what their use is. They are constantly there, operating that machine, to give us current information as to where these resources are located.

Now, that is essential so that when the damage or the strike would hit, we are able to very quickly come up with what is left. What de we have left? You can't make a good decision without that kind of information, and we have a tremendous capability in that field. We are trying to improve that capability at the State and local level.

Again, I point out how important it is that the Federal Government give these matching funds to help the State and the local governments strengthen their staff so that they can carry on this kind of an operation. This is most essential.

I could go into the details, but that is a matter of record, and perhaps you have questions you would like to present.

I have covered communications I believe earlier.

Maintenance of Government law and order: I think I covered that a little earlier in which I showed how we worked closely with the Department of Defense.

MARTIAL LAW

Mr. HOLIFIELD. Excepting you didn't touch on the point of declaration of martial law. Do you care to speak on that?

Mr. HOEGH. Yes.

Mr. HOLIFIELD. Have there been any changes?

Mr. HOEGH. Our objective, Mr. Chairman, is to so strengthen the capability of governments at all levels—and that is the continuity of

government program—that it will never be necessary to call upon martial law. Now, that doesn't say that it might not be, but our efforts are toward so strengthening civil government that martial law should not be called upon.

Now, Federal involvement—let me just read part of my statement on this point. I want to be sure I get the point correctly.

Upon request the Secretary of Defense will provide emergency military aid to civil authority to assist in maintaining law and order, providing it does not interfere with the conduct of the primary military mission. This is an important point, and one in which OCDM and the Department of Defense are in complete agreement. It is essential that State and local governments be fully prepared to preserve law and order in an emergency and especially to insure their own ability to control the situation.

Federal involvement in this area could be of two kinds: Assistance to State and local governments, or substitution for them. The first may not be possible and should not be counted on. The second should be avoided if at all possible—and that confirms what I just said.

It is possible that military assistance would be available to high State and local governments, particularly in maintaining law and order. It is not inconceivable that this could be a major function of some military forces in an emergency. But we join with the Department of Defense in emphasizing to States and localities that military forces can be spared only insofar as they are not needed for essential military missions.

As for Federal assumption of State and local authorities, both the practical difficulties and the evident disadvantages warrant every effort to assure that States and localities can keep their own houses in order during such a period. This is a major reason for the great stress we place upon continuity of State and local government. This, too, is why the capability to preserve law and order is an important part of State and local operational plans and the OCDM police services program.

Now, I want to point out most places have a good police force, and it is strengthened by auxiliary police. Not to take over but to be a part of, or to augment the existing police force. You have in the State the highway patrol, State police, you have conservation offices. All of these are being strengthened to maintain law and order.

Again, I point out that the Governor has access to his National Guard forces that are not earmarked for M-day, to help him in restoring law and order, and also—to maintain it, and to do it within civil government.

ALLOCATION OF NATIONAL GUARD

Mr. HOLIFIELD. Has there been any formal allocation of National Guard divisions on a pro rata basis in these different States? Any withdrawal of this group or division from those who are subject to military call?

Mr. HOEGH. Within the National Guard?

Mr. HOLIFIELD. Yes, within the States. Has there been an agreement between the Federal Government and the State Governors that a certain percentage of their National Guard divisions will not be called out, or are we faced with the same situation we were faced with 2 years ago when we were distinctly told by the military people that the military mission comes first, and if there is anything left over they will let the local people have it?

Mr. HOEGH. No——

Mr. HOLIFIELD. Has there been any change in that?

Mr. HOEGH. Yes.

Mr. HOLIFIELD. What has been the change? Has it been a formal change or just a matter of general agreement?

Mr. HOEGH. It is within the national plan, sir. Specifically, it states that the National Guard—outside of those that are M-day forces, and that is only equivalent to about six divisions—is available immediately to the Governor for his use and command.

Mr. HOLIFIELD. Until called?

Mr. HOEGH. That is right.

Mr. ROBACK. Do you know how many of these local people in all various municipal services are in the Guard and would be called out?

Mr. HOEGH. They are not going to call anybody out the day of the attack, I can assure you of that, and I am sure the chairman will agree with that.

For instance, in my State I think we have 55 communities that have a unit or more, so it is a well dispersed force. It would be a very accessible force, therefore, for the Governor to use.

Under most attack patterns that I have seen, I find that Iowa is not solidly blanketed. In many areas it is quite heavily contaminated, depending on the attack. So there may be areas in which this radiation would not be a handicap, initially. The Governor could use those forces quite readily the first day. In some instances he wouldn't be able to use forces for maybe 3 days, until he could get them out of the heavier contaminated areas.

Mr. HOLIFIELD. Governor, would you care to report on the matter discussed yesterday about a seminar for the clergy? Do you have any further clarification of that item?

Mr. HOEGH. No. I just don't know. Dr. Benson—I do know now that he did speak at that conference, and that his text had not been examined by me, and I doubt that his text had been examined by anyone else connected with our office, for this reason: He was there, and he spoke. He spoke from a manuscript that I never even distributed. And, secondly, we have that happen quite often, Mr. Chairman.

For instance, we have industrial conferences, and I have had men stand up from industry, make some statements probably that I would not concur in. And maybe Dr. Benson has made statements—this man you refer to—in which I would not concur.

I thought that the main point yesterday was that he talked against communism. Of course, I am for that. I am for talking against it, and beating it down. But I understand there were some other remarks in there that I would not subscribe to.

Mr. HOLIFIELD. We will give you a copy of it.

Mr. HOEGH. I will read that during the lunch hour.

Mr. HOLIFIELD. It goes far afield from civil defense and, of course, I recognize you can't be responsible for all public speakers, but I am sure you would not be responsible for this type of speech.

Mr. HOEGH. Not if he starts tearing down individuals. I don't believe in that.

Mr. HOLIFIELD. Perhaps you can submit a comment on it after you have read it.

Mr. Riehlman was also interested in it.

Had you finished?

Mr. HOEGH. I think on disaster services, that you are quite familiar with that. I think real progress has been made in casualty care and emergency public health. I would call it to your attention and suggest that each of you read it on page 2, under "Disaster Services." It shows how far the Department of Health, Education, and Welfare has gone toward developing this capability of serving people with medical service. We know it is a tremendous service, but we know it has to be good at the local level.

PROTECTED STORAGE

Mr. HOLIFIELD. Do you know that most of these medical supplies are not stored in underground protected areas?

Mr. HOEGH. Against all attack patterns, Mr. Chairman, on the ones we are responsible for storing, the losses to those that we have are less, on these attack patterns, than you will find with any other materials that are stored.

Let me point this out: Some of them are close to target cities. They have to be available to serve that target city. That is taking a calculated risk, because the bomb could land short or long. But it is so located that, generally speaking, it is there available for immediate commitment.

Then we have in some nontarget areas, quite a few of our stockpiles which we refer to as not the immediate but the secondary reserve. And then we have some underground, in underground storage centers, which we would call a more strategic reserve, or the general reserve for commitment, should any of these others not be available to a given community.

It is most important that you have that kind of an overall dispersion of your medical stockpile.

I intend, if we buy more, and it looks like we will, that I will put more in what I consider strategic underground locations. There are good facilities throughout the country for that.

I think also the storage there is less burdensome financially than it is in some of the other places where we have to have refrigeration. Most of these underground locations have an average temperature of about 50° to 54°, and the humidity is approximately 50 throughout that time. Most of these supplies would be put in that kind of area.

Under your attack pattern, for instance, I think in medical supplies that we have, the damage to them was less than 5 percent. We have run some test patterns four times as heavy as yours, and it would run up in the neighborhood of 18 to 20 percent.

EMERGENCY SERVICES

Now, for instance, we have worked with the American Medical Association, the Department of Health, Education, and Welfare, in what is known as the MEND program. Also, the Department of Defense has helped. That is medical education for national defense, which has added casualty care training to 70 of the Nation's medical colleges.

Now, the Department of Health, Education, and Welfare is conducting right now a test with region 3, and there they are developing and testing operational programs as a basis for use in other regions. HEW has a good working relationship with every health department of the various States, and they work closely with them, and I think it is the soundest way to develop this capability that there is.

Of our 1,932 medical hospitals—that is, the emergency hospitals of 200 beds, fully equipped from bandages up to X-ray machines—approximately 1,400 of those are now in different areas throughout the country. They are stored by either State or local governments, and they are stored in warehouses; plants buy them, and they maintain them. The others we are holding in strategic reserve. Not all of them, however, have been delivered. We still have about 400 which we hope will be delivered the balance of this year.

Then, also, in addition to medical care in emergency disaster services, we cover emergency welfare services which, of course, encompass all the services and assistance required to meet human needs for food, clothing, lodging; to furnish information on the conditions and whereabouts of persons; and to register persons in attack areas for use in reuniting families. The welfare area offers one of the best examples of cooperative effort among Federal agencies in planning and operations. Also, plans have been developed with the American National Red Cross and the Salvation Army for use of their resources at community and neighborhood levels.

There, also, we use churches and their facilities. Many churches have what is known as sort of a disaster service. The Mormon Church of the Latter-Day Saints, the Baptists, and many others have that type of service where they can go in and help people in case of a national disaster, and they could function in case of a manmade disaster.

Another subject matter which is most important, of course, is that of rescue. Emergency rescue functions have been assigned to over 200,000 people at the State and local level.

Now, we have provided a complete rescue training package for the State and local governments. As you know, we used to maintain a rescue school at Olney, Md. From it we trained leaders in every State, and they in turn then went out and established in their own States these rescue schools, and they conduct training. We contribute on a matching basis to implementing that training, or to accelerate the training of rescue workers at the State and local level.

The American Legion has organized and trained over 200 light-duty rescue teams. These are available to the State and to the local governments.

A similar program is under development for Explorer Scouts. We found they were most anxious to get into this, and we are working with them to develop this rescue-squad team.

As you know, the mail vehicles of the U.S. Postal Department are available for civil defense purposes. A program is nearly completed for converting some 7,000 mail trucks to emergency casualty carriers. Conversion fittings have been installed on four prototype trucks so for converting some 7,000 mailtrucks to emergency casualty carriers. program by about September 1 this year.

Emergency engineering, I covered that briefly, and in fire protection I might mention that for the past 18 months I have been working personally, and my staff has been working, with all the national organizations, including the International Fire Fighters, and all the others, in the perfection of our national fire plan. This now has been approved by all these national organizations that have firefighting responsibilities, including the insurance companies, and by the agencies of the Federal Government, and that plan is in effect. We are working with them now to conduct further training on a regional basis, along with these fire organizations, in order to train their leaders in the more comprehensive and the more difficult task of meeting thermal effects.

Mr. HOLIFIELD. That is the third bell, and we are going to have to leave. If you wish to submit notes for the record, they will be accepted. Later on we may wish to give you further questions for further clarification and answer. If you will be responsive to the inquiries we send you on that basis, it will be appreciated.

Mr. HOEGH. Mr. Chairman, do you intend to conclude this hearing now?

Mr. HOLIFIELD. Yes.

RADIATION ALARM DEVICE

Mr. HOEGH. May I offer for the record a little further statement with reference to testing of this combination radioactive radiation alarm devise about which you asked me yesterday? I think it is most important for you to know. We have tested this; the National Bureau of Standards has tested it, and they have found many weaknesses, such weaknesses that we would be negligent and guilty of negligence if we did not perfect this device.

Mr. HOLIFIELD. We will be glad to have a further statement on that matter.

(The statement referred to appears on p. 77.)

Mr. HOLIFIELD. Governor, we thank you for your appearance here and the information that you furnished us.

Mr. HOEGH. Mr. Chairman, may I offer one more additional clarification of my statement with reference to radiation exposure, about genetics that you raised?

(The following information was submitted:)

OCDM POLICY REGARDING RADIATION EXPOSURE

In a nuclear war our objective is to control radiation exposure to the general public by use of fallout shelter; postattack evacuation of the areas of most intense fallout; and by decontamination measures. Exposures will be controlled to the maximum extent practicable in order to limit the incidence of undesirable long-range factors such as leukemia, genetic damage, shortening of life span, etc. However, under conditions of most intense fallout and in carrying out emergency operations it may not be feasible to control exposures to this extent. Under these conditions every effort will be made to limit the acute exposure to less than 200 r and thus prevent the occurrence of radiation sickness.

Mr. HOLIFIELD. Very well.

Mr. HOLIFIELD. Tomorrow we will have General LeMay, Air Force Vice Chief of Staff, who will be the witness, and on Thursday Admiral Burke, Chief of Naval Operations, will be our witness.

General LeMay will testify on the hardened base system for our missile bases, and Admiral Burke will testify primarily on the naval capabilities in relation to Polaris, on Thursday.

The meeting is adjourned.

(Whereupon, at 12:25 p.m., the subcommittee adjourned.)

(The following additional summary statement was submitted for the record by Governor Hoegh:)

GENERAL STATEMENT DELEGATE AGENCIES

My Office coordinates and directs the civil defense and defense mobilization activities of the Federal Government.

In many minds there is still an image of civil defense as something apart from regular government, something that would spring into being to bear the vast responsibilities of home defense, and to recover in case of attack. This image is false. These responsibilities rest squarely on regularly constituted government. This is true of the Federal Government as it is of our State and local governments.

OCDM provides guidance, leadership, and some funds to various other departments and agencies. The funds pay for certain highly specialized services. They can never pay for the vast direct and indirect efforts by these departments on behalf of nonmilitary defense. They cannot, because these efforts are part of doing business from day to day.

At the committee's request, we have tabulated data relative to allocation of personnel and functions of these departments. This effort represents only a small part of the U.S. Government's activities on behalf of nonmilitary defense.

I will point out to you specific examples of the many activities of the departments. I will outline the projects which these departments have undertaken in direct support of civil defense, and I will indicate by a few examples the civil defense activities which are part of the regular functions of these agencies.

There are many direct contributions, for example, by the Department of Agriculture, and we contract for some of them. However, the cost of planning for the control and distribution of foodstuffs is absorbed by the Department's regular appropriations. Again, we pay for specialized fallout forecasts by the U.S. Weather Bureau, but these forecasts would be impossible without the vast observation, communication, analysis, and publications network of the Bureau itself. Right now, the Weather Bureau is undertaking research concerning dust-

storms. We are interested because fallout is, in a sense, radiological "dust." The cost of this research, however, is not charged to civil defense funds.

We have developed through the support of the General Services Administration and of the Military Establishment a specialized communications network capable of carrying command and control information throughout various governmental units and to the people in event of an attack. Few people realize that the collateral benefit of this system is that the communications segment of it is a backup to military communications. Another benefit, of importance any day in the year, is that the warning segment is used to tell State and local authorities of threats from the elements. The warning circuits are also used to coordinate search and rescue parties when aircraft are downed. This aspect of our work has been particularly valuable to the Strategic Air Command.

Through coordination, guidance, and example, we seek to keep the entire Federal Government's attention on the vast nonmilitary defense responsibilities. Were it not, however, for the understanding and backing of our Cabinet Officers and heads of agencies and their staffs, our job would be impossible.

We pay $6,250,000 for coordination and specialized services rendered by 489 employees of other Federal agencies.

STATUS OF FEDERAL AGENCY ASSIGNMENTS

In accordance with instructions from the President at the time FCDA and ODM were merged, the outstanding delegations of both agencies were consolidated into executive orders.

These orders involving the six major resource Agencies—Agriculture; Commerce; Interior; Health, Education, and Welfare; Housing and Home Finance; and Labor—were transmitted to the Bureau of the Budget on April 1, 1959. Since then they have been in interagency clearance and are now ready for transmittal to the Department of Justice by the Bureau of the Budget for final clearance prior to receiving the President's signature.

There are 119 departments, agencies, commissions, and committees now listed in the U.S. Government Manual.

In keeping with our policy of building civil defense and defense mobilization into existing government wherever possible, we plan to make assignments to all 41 agencies which have a potential operating capability.

Orders for 8 agencies are in the Bureau of the Budget: 17 are in clearance, and the remaining 16 are being drafted.

FEDERAL AGENCY FINANCIAL SUMMARY

A total of $6,250,000 has been set aside by OCDM for financing of Federal agency assignments out of the fiscal year 1960 appropriation for "Salaries and expenses."

	Allocations	Positions
To the 9 reporting agencies listed in the table below	$5,450,000	482
General Services Administration	752,000	1
Federal Communications Commission	15,000	1
Small Business Administration	15,000	1
Veterans' Administration	15,000	1
Contingency	3,000	
Total	6,250,000	486

The allocation to GSA is largely for defraying recurring costs and maintenance of established emergency communications systems. Allocations to FCC, SBA, and VA are principally for liaison and work on the national damage assessment system. These agencies are not required to make quarterly reports to OCDM on progress of their activities.

The financial summary for the nine reporting agencies appears in the table below:

Department or agency	Allocations	Positions
Agriculture	$240,000	19
Commerce	2,329,000	72
DHEW	1,442,000	158
FAA	90,000	12
HHFA	140,000	18
Interior	373,000	25
ICC	20,000	1
Labor	800,000	175
Post Office	16,000	2
Total for reporting agencies	5,450,000	482

DEPARTMENT OF AGRICULTURE—HIGHLIGHT

Current budget

Positions, 19; funds allocated, $240,000.

Assignment

Prepare national emergency plans and develop preparedness programs covering (1) food resources, farm equipment, fertilizer, and food resource facilities; (2) rural fire control; (3) defense against biological warfare, chemical warfare, and radiological fallout; and (4) farm community advisory service.

Current activities

A. *Radiological defense training.*—The Department is operating a radiological defense training program to man 450 Federal radiological fixed-monitoring stations.

B. *Rural fire defense.*—The Department is improving techniques and working tools in order to provide a more rapid and accurate fire damage assessment program which will make possible the use of machine calculations in place of the present hand assessment calculations.

C. *Regional liaison representations.*—The Department provides one full-time representative at each of the eight OCDM regional headquarters.

D. *National Damage Assessment Center.*—The Department provides a representative at the National Damage Assessment Center.

E. *Food resources.*—Plans and procedures are being developed for the controlling and distributing of the food resources of the Nation after attack.

Achievement

In fulfilling its responsibilities, the Department has established, in coordination with OCDM, a national network for monitoring radioactive fallout consisting of 450 stations to provide a national capability for recognition and alleviation of this danger to all human, plant, and animal life. Plans have been made and are in effect for defense against biological and chemical warfare.

Rural fire defense plans and programs are being developed in 47 states. A capability for damage assessment has been established and is constantly being improved. An emergency program has been readied for continued food production, processing, and distribution in emergencies. This program includes requirements and supply analysis, stockpiles, resources protection, continuity of the food industry, claimancy data for necessary supporting nonfood materials and facilities, and coordination with Commerce, Interior, and ICC to provide the best possible emergency capability in the food area. In addition, a continuing program of research is being carried on to enable the Department to better discharge its responsibilities.

DEPARTMENT OF COMMERCE—HIGHLIGHTS

Current budget

Positions, 72; funds allocated, $2,329,000.

Assignment

Develop preparedness plans and programs covering:

(a) The production and distribution of all materials; the use of all facilities; the control of all construction; and the furnishing of basic industrial services, except those specifically assigned to other agencies.

(*b*) Federal action with respect to all highways, roads, streets, bridges, tunnels, and appurtenances; highway traffic regulation, civil air transportation; all coastal and intercoastal and ocean shipping, ports and port facilities; and the St. Lawrence Seaway; except those elements of each normality operated or controlled by the Department of Defense.

(*c*) Fallout forecasting based on current weather data.

Current activities

A. *Weather Bureau.*—Provides meteorological assistance for civil defense at OCDM headquarters and in the regions, providing fallout and severe weather forecasts.

B. *Maritime Administration.*—Carries on defense mobilization program for all ports, locks, and dams, including damage assessment and continuous inventories.

C. *Bureau of Public Roads.*—Furnishes representative to NDAC and conducts a going program of emergency planning for control of roads and appurtenances.

D. *Census Bureau.*—Furnishes representative to NDAC; is updating national code for use of 1960 census data; is preparing postattack sampling plans; and is assigning manufacturing plant file numbers.

E. *Defense Air Transportation Administration.*—Conducts Defense Production Act, Executive order, and Department order activities with respect to the civil reserve air fleet aviation war risk insurance, the war air service pattern, the national defense emergency airlift, NATO, and the air priorities system.

F. *Business and Defense Services Administration.*—Under the Defense Production Act, the National Security Act, and other directives, carries on continuous activities with respect to the national stockpile, survival items, supply requirements, and production control studies, protection of industry, defense plant rating, expansion goals, tax amortization, NDAC assistance, and organization and training of executive reservists.

Achievements

The department as a whole has participated extensively in radiological defense training, first aid, rescue, firefighting, and warden training.

The Defense Air Transportation Administration has updated its plans for the emergency use of the civil reserve air fleet. The national emergency defense airlift fleet has been updated and a manual for a wartime air priority system has been drafted.

The Bureau of the Census is supporting the activities of OCDM's National Damage Assessment Center with assigned personnel.

The Business and Defense Services Administration has simplified its regulations to increase effectiveness of production and construction defense contractors. The barter program for disposal of surplus agricultural material has been updated; 2,820 contractors have been assisted on defense problems and 131 producer surveys have been made.

The Maritime Administration has inaugurated a national program for operation of U.S. seaports in emergency, including coordination with some 90 port authorities and the Army Corps of Engineers.

The Bureau of Public Roads assists NDAC and has made studies of transportation, road construction and maintenance in seven States.

The Weather Bureau provides forecasting services on radioactive fallout at 75 locations and meteorological services to OCDM throughout the country.

FEDERAL AVIATION AGENCY—HIGHLIGHTS

Current budget

Positions, 12; funds allocated, $90,000.

Assignment

Insofar as nonmilitary programs are concerned, prepare national emergency plans and develop preparedness programs covering the emergency management of the Nation's civil airports, and civil aviation operating facilities, excluding the manufacture and priority on use of aircraft, but including national program guidance, professional training, stockpiles, monitoring, decontamination, resources and requirements, salvage and rehabilitation, damage assessment, and facilities protection.

Current activities

A. FAA is providing leadership and technical guidance to the aviation industry for the protection of essential civil aviation operating facilities.

B. They are developing plans and technical standards for the emergency clearance and restoration of essential civil airports.

C. They are developing plans, procedures, and technical guidance for the emergency utilization of repair stations.

D. They are providing liaison with the Office of Civil and Defense Mobilization at the national and regional levels.

E. They are developing plans for protective construction measures to civil airport facilities.

F. They are developing plans and procedures to initiate a radiological monitoring network at civil aviation facilities.

Achievements

The Agency is developing a radiological monitoring training course specifically adapted to the requirements of civil aviation facilities, and has trained 1,200 fixed monitors. A handbook on decontamination of aircraft and equipment for airport operators and maintenance base operators is under preparation; shelter requirements for civil airports are being studied and materials are being prepared for the use of personnel at these airports. Vulnerability studies of civil aviation facilities and supporting services are being prepared to provide a base for action under emergency conditions. Regional civil aviation defense planning officers have been assigned to maintain liaison with OCDM regional offices.

FEDERAL COMMUNICATIONS COMMISSION—HIGHLIGHTS

Current budget

Positions, 1; funds allocated, $15,000.

Assignment

At the present, the only assignment to FCC is in connection with the furnishing of data to the National Damage Assessment Center. A more comprehensible assignment to FCC is now being studied.

Current activities

Provides one man at the National Damage Assessment Center to obtain and interpret communications data.

Carries on continuous development and updating of plans for emergency operations at relocation sites, including current maintenance of records essential in an emergency.

Conducts training of executive reservists and agency personnel in emergency operating procedures.

Renders engineering assistance in interagency efforts to the extent that manpower is available.

Achievements

The Commission has established relocations sites, assigned and trained personnel, positioned essential records, and established communications at the sites. A system for radio control, conelrad, and statewide emergency FM communications networks have been established. Damage-assessment data has been developed and tested for use by the National Damage Assessment Center and is continuously being updated. All emergency activities are coordinated with other interested agencies.

GENERAL SERVICES ADMINISTRATION—HIGHLIGHTS

Current budget

Positions, 1; funds allocated, $752,000.

Assignment

Prepare national emergency plans and develop preparedness programs covering (1) Federal buildings, (2) service management, (3) telecommunications, (4) transportation, (5) records management, (6) emergency Federal Register, (7) Federal supply, (8) critical material stockpiling.

Current activities

GSA provides for the recurring costs and maintenance of the standby teletype equipment and facilities installed outside of target areas. Items included

are the annual cost of 13 relocated relay centers, including eastern switching center B, western switching center B. GSA maintains a person at the OCDM's National Damage Assessment Center.

GSA is currently managing the strategic stockpile out of funds appropriated for that purpose.

GSA also manages the medical stockpile and engineering stockpile on a reimbursable basis.

Achievements

GSA has provided an emergency telecommunications system designed to withstand nuclear attack, including radiation and fallout effects. It serves approximately 100 agencies from 65 emergency operating locations, and its personnel will be augumented in an emergency by a corps of 300 trained reserves. The Washington area warning system was installed and will be maintained, under contract, by General Services Administration.

A program and guidance for the use of other agencies in the protection and disposition of vital records have been developed. A depository for the storage of indispensible records has been established, and assistance has been given to agencies in the selection, shipping, storing, and keeping current of emergency records.

A system has been developed for replacement of the Federal Register in an emergency. An Exercise Emergency Federal Register was designed and used in past national exercises.

GSA has procured warehouse space, and stored, assembled, maintained, and shipped stockpile items of medical, engineering, and radiological supply. Twenty-two depots with over 2¼ million square feet of space have been established.

A program for the protection of all federally owned or leased facilities and their occupants has been developed, and studies of public buildings have been made to determine shelter requirements and costs.

A damage assessment program is in existence with some 80 employees participating.

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE—HIGHLIGHTS

Current budget

Positions, 158; funds allocated, $1,442,000.

Assignments

Prepare national emergency plans and develop preparedness programs covering health services, civilian health manpower, and health resources.

Prepare national emergency plans and develop preparedness programs covering emergency welfare services and education programs.

Current activities

A. *Health mobilization program.*—(1) Provides guidance and assistance to the States and communities for the health and medical aspects of their disaster preparedness plans.

(2) Planning, training, and testing the operational methods for emergency health programs.

(3) Planning and implementation of a national emergency water-supply plan.

(4) Analysis and planning of civilian health resources and requirements.

(5) Preliminary planning for conduct of casualty rehabilitation program.

(6) Research.

B. *Food and drug activities.*—(1) Conducts training courses for Federal, State, and local food and drug officials.

C. *Emergency welfare services.*—(1) Coordinates work with other Government agencies and national voluntary agencies in the development of a national program of essential welfare aid and services.

Achievements

Plans have been developed and expanded to cover all areas of emergency health requirements. Research and training related to safety of food and drug resources, basic welfare services, and civil defense education have been initiated.

The Public Health Service has assigned full-time mobilization personnel to regional and State offices; has organized a national laboratory network for identifying and combating communicable diseases. Some 10,000 persons have been trained in emergency health activities.

The Food and Drug Administration conducted intensive training for professional staff and State and local officials in 47 States and for some 3,000 individuals. A training manual for these people was developed and distributed nationally.

The Social Security Administration developed planning and readiness agreements with 48 State welfare departments and issued a comprehensive manual on emergency financial assistance and emergency clothing. An expanded welfare service program was started, including lodging, feeding, registration, and other welfare aids. Assistance was given to OCDM in preparing Annex 19: Emergency Welfare to the National Plan.

HOUSING AND HOME FINANCE AGENCY—HIGHLIGHTS

Current budget

Positions, 18; funds allocated, $140,000.

Assignment

Prepare national emergency plans and develop preparedness programs covering all aspects of lodging or housing, and provide assistance to OCDM in developing economic stabilization measures pertaining to real estate credit controls and rent stabilization programs and organization.

Current activities

A. *Administration.*—Preparation of detailed plan for conversion of all HHFA components to emergency organization.

B. *Emergency housing.*—Preparation of plans for emergency barracks units on basis of advice from Government and industry sources and instructions as to use, and for use of mobile housing units.

C. *Community facilities.*—Preparation of guidance, handbooks, and maps on water supply, for use in locating reception centers, and repair of damaged facilities.

D. *Emergency lodging and billeting.*—Coordination of lodging and billeting plan with plans for registration, feeding, health services, etc.

E. *Training.*—Conduct of field training programs.

F. *Rent stabilization.*—Development of plans for rent stabilization program on the basis of alternative approaches.

G. *Damage-assessment representation.*—Provision of liaison at National Damage Assessment Center.

Achievements

Positive steps have been taken to assure the continuity and proper management of the Agency in emergencies. An annex to the national plan for civil defense and defense mobilization, entitled, "National Emergency Housing Plan," has been developed and will be published soon.

The emergency lodging plan was developed by FHA and is being coordinated with the Department of Health, Education, and Welfare before publication. Plans are being developed for the emergency use of temporary housing and the construction of more permanent housing. Development of plans for providing temporary water and sanitation facilities has begun. The Agency has developed to an appreciable degree a capability to assess the effects of attack on housing and community facilities at both national and field levels.

Far-reaching policy decisions aimed at encouraging the construction of blast and fallout shelter have been developed in cooperation with OCDM. The planning and development of a rent stabilization program has been started.

DEPARTMENT OF THE INTERIOR—HIGHLIGHTS

Current budget

Positions, 25; funds allocated, $373,000.

Assignment

Prepare national emergency plans and develop preparedness programs covering (1) electric power, (2) petroleum and gas, (3) solid fuels, and (4) minerals.

Current activities

A. The Department of the Interior is further developing mobilization programs in the areas of electric power, petroleum and gas, solid fuels, metals, and minerals.

B. The Department of the Interior is developing plans and procedures and initiating emergency resources management programs which will develop a management capability for fuel and energy resources at regional and State offices with respect to the demand and supply of resources in an emergency situation.

C. The Department of the Interior is providing one Department representative at the National Damage Assessment Center to maintain liaison with the Office of Civil and Defense Mobilization, other Federal agencies, and carry out other duties as assigned by the Department of the Interior.

D. The Department of the Interior is providing one electric power and two petroleum and gas representatives at regional offices.

Achievements

National plans have been approved and are being implemented for electric power, oil and gas, solid fuels, and minerals operations during a national emergency. Field organizations have been established to handle postattack power supply and to control production and distribution of solid fuels. Executive reservists are being designated and trained under all these plans.

Surveys have been made on essential survival materials in the utilities inventories and on generating stations; 246 major mobilization studies have been made on 37 materials; and a long-range petroleum supply-demand study is in final summary. A coordinated plan for rural fire defense is being implemented. Emergency activities with respect to underground water sources are being geared into State plans. Radiological training courses have been instituted throughout the Department.

INTERSTATE COMMERCE COMMISSION—HIGHLIGHTS

Current budget

Positions, 1; funds allocated, $20,000.

Assignment

Prepare national emergency plans and develop preparedness programs covering (1) railroad utilization, reduction of vulnerability, maintenance, restoration, and operation in an emergency; (2) motor-carrier utilization, reduction of vulnerability, and operation in an emergency; (3) inland-waterway utilization of equipment and shipping, reduction of vulnerability, and operation in an emergency, excepting the St. Lawrence Seaway; (4) guidance and consultation to domestic surface transportation and storage industries regarding emergency preparedness measures; (5) guidance to the States in development of their transportation plans.

Current activities

The services being performed by the Interstate Commerce Commission are devoted primarily to assisting the Office of Civil and Defense Mobilization to develop program details of mobilization plans, and to continue field relationships between the Office of Civil and Defense Mobilization and the Interstate Commerce Commission in providing advice and testing mobilization operations plans in preparation for a civil defense emergency.

Achievements

In order to provide a state of readiness, in being, in the defense transport area, concentrated efforts have been applied to the development of an effective executive reserve program. Self-development industry-protection programs and self-triggering transportation orders (prepositioned) have been established. Nationwide transportation facility and manpower data have been developed and refined for application in a postattack damage-assessment operation. Mobilization plan manuals, etc., are continuously updated, and assistance is given on a current basis to transportation operators at local levels.

DEPARTMENT OF LABOR—HIGHLIGHTS

Current budget

Positions, 175; funds allocated, $800,000.

Assignment

Prepare national emergency plans and develop preparedness programs covering civilian manpower mobilization.

Current activities

A. *Expansion, distribution, skill, development, and utilization of the labor force.*—In the area of expansion, distribution, skill development, and utilization of the labor force, attention is being directed to utilization of women, and identifying training problems for minimizing postattack adjustments. Guidelines are being prepared for State employment offices and coordination with State survival plans is being effected.

B. *Wage stabilization during an emergency.*—Planning of a ready-to-operate wage stabilization program has been started and steps are being initiated on plans to minimize effects of labor disputes.

C. *Economic statistics in support of policy and operations.*—Data is being summarized for use in postattack estimates of surviving ltbor force and for use by NDAC. Study is underway on postattack manpower efficiency. Liaison is maintained with NDAC.

D. *Emergency manpower organization and operations.*—Guidelines to States for postattack employment security operations are being updated. A defense manpower representative is assigned to each OCDM regional office. Funds have been assigned to State agencies for emergency manpower readiness units to translate national guidance into operational procdures and to coordinate with State civil defense authorities.

E. *Central direction and coordination.*—Emergency activities have been assigned to the bureaus and guided in accordance with overall plans on a coordinated basis. The executive reserve program is being expanded.

Achievements

Two civilian manpower readiness publications are being revised. Numerous manpower conferences have been held. Supporting funds of $310,000 were granted to the States for defense readiness activities for the last half of fiscal year 1960. Occupational studies for damage assessment have been made.

A plan for compensation of authorized civil defense workers is being prepared. Selection of executive reservists for use in the area of wage and salary stabilization and labor disputes is being conducted. Guidelines for the postattack development of a wage stabilization capability at the State and local level are in preparation. Extensive research has begun on the personal and industrial effects of bomb damage.

Civil service mobilization circulars on operational arrangements between the emergency manpower authorities and the Civil Service Commission have been published. Regional labor manpower committees have been realined to conform to the OCDM regional structure.

POST OFFICE DEPARTMENT—HIGHLIGHTS

Current budget

Positions, 2; funds allocated, $16,000.

Assignments

Assist in planning a national program and developing technical guidance for States and directing post-office activities concerned with (1) registering persons and families, (2) receiving and answering welfare inquiries, and (3) reuniting families in civil defense emergencies.

Current activities

A. The Post Office is developing a nationwide program for the collection and reporting of data relating to the types of resources which will enhance the capability of the National Damage Assessment Center to evaluate total national resources in the event of an enemy attack upon the United States.

B. It is developing a system of registration for locating displaced persons and reuniting separated families.

Achievements

Data covering exact locations of important post-office establishments and facilities and postal zones in the 50 States and Guam have been furnished to the National Damage Assessment Center.

A Post Office Department manual covering the distribution and processing of emergency change-of-address cards and safety notification cards and the operation of central postal directories has been initiated. The Department, in cooperation with the Department of Health, Education, and Welfare, has begun the development of a postal employee training manual for the integration of registration and information activities of State and local governments.

Plans have been developed for civil emergency use of post-office equipment, and 4,000 trucks have been so designated. Necessary emergency operating records have been prepositioned in all post-office regions.

SMALL BUSINESS ADMINISTRATION—HIGHLIGHTS

Current budget

Positions, 1; funds allocated, $15,000.

Assignment

Prepare national emergency plans and develop preparedness programs covering (1) coordination of small-business requirements with military and procurement agencies; (2) utilization of the productive capacity of small business; (3) provision of essential operating information to small businesses; (4) financing the restoration of essential businesses damaged by attack; (5) financing the production of products for military and essential civilian purposes; and (6) financing war production activities and necessary wartime conversions.

Current activities

The Small Business Administration, in consultation and cooperation with the Office of Civil and Defense Mobilization, is furnishing the full-time services of one employee on liaison detail to the Office of Civil and Defense Mobilization National Damage Assessment Center. This employee is engaged in providing technical direction and coordination to the Small Business Administration, Washington, and field offices in connection with the cataloging of small plants and locating facilities which would be needed in case of an emergency.

Achievements

The Administration has developed a comprehensive continuity of government program. Preattack measures, e.g., executive reserve recruitment, prepositioning of self-triggering action documents, etc., have been taken to provide readiness in this segment of the mobilization base.

Emergency organizational plans, staffing requirements, and operational procedures are being updated. An executive order has been drafted which would clarify areas of postattack operation between the Department of Commerce and the Small Business Administration.

VETERANS' ADMINISTRATION—HIGHLIGHTS

Current budget

Positions, 1; funds allocated, $15,000.

Assignment

Prepare national emergency plans, under the direction of the Department of Health, Education, and Welfare, for the utilization of the agency's resources concerned with health and welfare programs. Under the direction of OCDM, prepare plans for the utilization of the agency's resources in the stabilization program.

Current activities

Activities of the Veterans' Administration include the provision of one man at the National Damage Assessment Center.

(1) *Shelter.*—Shelter construction is included in all new hospital planning.

(2) *Damage assessment.*—A capability is maintained to assist the OCDM Damage Assessment Center in assessing the effects of attack upon VA facilities and resources.

(3) *Emergency operations.*—Each VA hospital possesses plans which provide for immediate action in the event of an emergency.

Achievements

Shelter construction is included in all new Veterans' Administration hospital planning. Each VA hospital has developed plans which provide for immediate emergency action. A capability is maintained to assist the OCDM Damage Assessment Center in assessing the effects of attack upon VA facilities and resources.

CIVIL DEFENSE

Part III—Relation to Missile Programs

WEDNESDAY, MARCH 30, 1960

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON MILITARY OPERATIONS
OF THE COMMITTEE ON GOVERNMENT OPERATIONS,
Washington, D.C.

The subcommittee met at 10 a.m., Hon. Chet Holifield (chairman of the subcommittee) presiding.

Members present: Chet Holifield, Joe M. Kilgore, Mrs. Martha W. Griffiths, and R. Walter Riehlman.

Also present: Herbert Roback, staff administrator; Carey Brewer, special consultant; Douglas Dahlin, staff attorney; and Paul Ridgely, investigator.

Mr. HOLIFIELD. The subcommittee will be in order.

This morning we are pleased to have Gen. Curtis LeMay, Vice Chief of Staff of the Air Force, testify on the Air Force program for hardening ICBM sites in the continental United States.

For the record, I want to state that General LeMay and his staff presented a classified briefing on this topic to the committee in executive session last Friday. Although some of the material set forth at that briefing will not be presented today for security reasons, I am hopeful that at least the main points can be covered in this public session.

The main purpose of this series of hearings is to consider the state of civil defense preparedness, with particular emphasis on shelters for our population. This committee is gravely concerned over the present lack of civil defense shelters in our country. We are also concerned over the civil defense implications of hardened missile sites within the continental United States. According to information already made public, the planned locations of some of these missiles sites will jeopardize various populated centers in the event of a concentrated enemy assault against these missile bases.

Because of the widespread fallout of deadly radioactive particles in the event of an enemy attack, the location of these sites may also endanger the great agricultural heartland of the Nation.

General LeMay, I know that you share this committee's concern for these hazards to our people and to our food resources in the event of an enemy attack. As one who has carried a heavy responsibility for many years as commander of the Strategic Air Command, and presently as Vice Chief of Staff of the Air Force, I am sure you have given much thought and study to this problem.

We are pleased to receive your testimony at this time.

I want you to know of the high regard our subcommittee has for you, sir, and for the service that you have rendered the Nation in keeping us well prepared to deter a possible enemy attack. I know every member of our subcommittee shares that respect for you and appreciation for the services you have rendered.

We are now ready to hear your prepared testimony, sir.

STATEMENT OF GEN. CURTIS E. LeMAY, VICE CHIEF OF STAFF, USAF; ACCOMPANIED BY MAJ. GEN. H. C. DONNELLY, ASSISTANT DEPUTY CHIEF OF STAFF, PLANS AND PROGRAMS, USAF

General LeMay. Thank you very much, Mr. Chairman and members of the subcommittee.

It is a pleasure to appear before your committee today in connection with your hearings on civil defense.

I understand that you are interested in matters relating to the selection of our ICBM sites. In selecting sites there are certain basic things that should be kept in mind. First, we must face the fact that the United States itself is a target in an all-out war. We must assume that an enemy will attack all of the basic national strengths of our country in an attempt to destroy the total will and capability of our country to resist. This means he will attack not only our military forces but also our centers of Government, our urban industrial areas, and centers of transportation and communication as well. Since many of these targets are located in or immediately adjacent to our cities this inevitably means direct attack of population centers, themselves.

Second, in the event of war, the enemy will surely use all of his long-range nuclear weapons against the United States before he abandons his military efforts. That is, we cannot plan on him surrendering without bringing to bear all of his firepower.

There are two basic tasks to be carried out by our military forces. First, they must be able to deter any rational enemy from initiating war. Second, if deterrence should fail our military forces must be able to fight a war with the objectives of minimizing damage to our country and concluding hostilities on terms which are as advantageous as possible to this country and which would insure the preservation of our freedom and way of life.

These two basic tasks require the following national capabilities:

(*a*) We must maintain as our highest national priority a military force capable of counterforce operations. This means a force capable of destroying or neutralizing enemy forces which can be employed against our Nation. If our forces are to carry out the essential military task of minimizing damage to our country, a strong strategic force, securely based with quick reaction capability, responsive to immediate control with high survivability, must be the basic element of our total military force. No matter how war is initiated, this strategic force must be capable of quickly destroying enemy long-range nuclear delivery forces as well as his basic national strengths to preclude continued military operations against the United States involving repeated atomic attacks. This is the deterrent posture that the United States has maintained for the past 15 years. The fundamental soundness of this policy is attested to by the fact that general war has been deterred.

(*b*) Our military force must also include an active defense capability to engage enemy forces en route to targets in the United States as a further means of minimizing damage to our country and attrition to our forces.

(*c*) We must also provide protection to our population by practicable passive defense measures. Civil defense has the same identical objective as counterforce operations and active defense operations, namely, minimizing damage to our country and its people. Thus, civil defense is a vital element of our national deterrent posture and is another factor which must be carefully assessed by any potential enemy in calculating his chances of success.

We are now introducing ICBM's into the operational inventory of our strategic forces. The ICBM program which includes Atlas, Titan, and Minuteman missiles, provides for these weapons to become a major part of our total strategic capability. Hardening of these missiles will provide high survivability from enemy attack. This is an important aspect of the total contribution of our missile force to an effective deterrent posture. Current plans call for hardening to be introduced early in our missile force buildup. Hardening of our ICBM's, coupled with dispersal and adequate force size, confronts our potential enemy with a force which will survive in sufficient quantity, no matter what his action, so that the retaliatory blow against him will be unacceptable.

The number of enemy weapons which would be required to destroy one of our missile sites is dramatically increased by hardening. Depending upon the yield, accuracy, and reliability assumed for an enemy ICBM, the number of his ICBM's required to knock out one of our missiles sites is increased from 2 for a single unhardened site to between 10 and 30 for one of our hardened sites now under construction. Higher levels of hardening will be introduced as required which will increase the number of enemy weapons required to between 20 and 40 weapons for a single U.S. hardened missile site. The enemy would have to build a great many missiles to overcome any sizable number of U.S. missiles hardened to this degree. Thus, hardened missiles are an important element of our total military posture and dramatically increase the effectiveness of our deterrent posture.

If deterrence should fail as a result of an irrational decision on the part of a potential enemy, these hardened missile sites will serve to reduce the total casualties in the United States. They will draw some of the enemy ICBM's or submarine-launched missiles away from our population centers which would otherwise be their targets. They will also divert a portion of the total attack away from the more densely populated area of the United States.

It has been suggested from time to time that we deploy our ICBM's outside the United States. There are several reasons why this is not a prudent course of action. First of all, most such locations outside the United States which are geographically and geologically suited for deployment of hardened missiles are within range of the much more numerous short-range forces of our potential enemies, including nonnuclear forces. Deployment of our ICBM's in this manner would actually increase the potential danger to our civilian population by permitting more enemy long-range weapons, including ICBM's, to

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be targeted against our urban industrial areas or other targets co-located with population centers.

A second consideration is the fact that there could be serious problems with regard to unilateral control of our nuclear capable forces if we were to deploy our ICBM's in areas where the United States did not have complete sovereignty.

Perhaps the most important reason against deploying our ICBM's or any significant portion of our strategic forces outside the United States is the impact that this could have on our deterrent posture. The effectiveness of deterrence hinges a great deal on the credibility of our response to an attack on our forces. For example, there is no doubt in the minds of the Soviets that an attack against our military forces deployed within the sovereignty of the United States or other targets within the United States will bring a sure and automatic response; they have violated the sovereignty of the United States itself. On the other hand, the Soviets may not be convinced that our response would necessarily be automatic if a significant portion of our strategic forces were based in open areas outside the United States. In such a case an enemy could be tempted to attack them in a piecemeal fashion, rationalizing that we would not respond by attacking his homeland since this in turn invites a direct attack on the United States itself. In view of these considerations we have concluded that the major portion of our strategic capability must be intimately associated with our fundamental sovereignty so that a would-be attacker has no doubt as to our response.

In the selection of specific locations for ICBM sites within the United States, the Air Force has given due regard to the potential danger to the civilian population from such sites. Missile bases are so located that the direct effects of a nuclear attack—blast, heat, and prompt radiation—are minimized as far as practicable. The general area selected for ICBM units encompasses the less densely populated part of the United States. These considerations result in an actual reduction in the total number of casualties which would otherwise occur in the United States as any enemy attack against hardened ICBM units so located serves to dilute the attack against other targets that are adjacent to our population centers.

The detailed criteria established for ICBM site selection includes in addition such aspects as coverage of potential enemy targets, maximum utilization of existing military facilities, dispersal of individual, sites, geological suitability for hardened base construction, and overall cost.

The specific deployment sites are analyzed on a case-by-case basis taking into account all elements of the siting criteria. The specific site selections must, of course, be based on the best compromise of all factors but must insure the operational effectiveness of the force. Exceptions to the criteria are made only where the operational factors are overriding.

Diversification of our strategic forces, while not an end to be sought at any price, is an important objective. Mobility for a portion of our ICBM's will complicate the targeting problem of a potential enemy and place greater demands on his resources. A mobile ICBM presents an entirely new and different problem to the enemy. Our larger ICBM's are not well suited to a mobile concept but we are exploiting

mobility by developing a railroad version of Minuteman. Mobile ICBM's deployed in the United States will serve to draw enemy firepower away from our urban industrial areas in much the same way as our hardened sites.

In summary, if general war occurs the entire United States will be a target. This means that our industrial complexes, Government control centers, transportation and communication centers located in our cities, will be targets just as much as our military forces and our ICBM sites. The only way to insure that damage to our country is minimized is to maintain strong, modern, ready forces that can survive any attack and hit back. Our ICBM units would be a very important part of such ready forces.

Strong, ready, and survivable forces, including ICBM's, will be a powerful deterrent. If deterrence should fail, our hardened ICBM's will significantly reduce the total casualties since they will draw fire away from targets located near large cities. These ICBM forces must be considered as protection and not potential danger.

Civil defense is a vital element of our national defense posture. As I understand it, the aims of civil defense are the same as ours. We harden missile sites so that our missiles will survive an enemy attack. All civil defense actions tend to harden our population so that they will survive an enemy attack.

Mr. HOLIFIELD. Thank you, General, for your statement.

Mr. Riehlman.

Mr. RIEHLMAN. Mr. Chairman, I only commend the General for an excellent statement with respect to the Air Force's position in its approach to this problem of locating our ICBM's in areas where the least amount of population affected by attack, and a need for hardening of the bases, and also I am happy to see there is a great interest in the selection of a mobile—maybe I am not phrasing this properly, but that the Air Force is considering at this time the mobile units of ICBM's which I think is very essential and important.

Of course, our committee's interest is what the effect will be should this country be hit by nuclear attack and our hardened bases located in areas where the fallout effect would be detrimental, and lethal, to a number of our people.

I haven't had a chance to study carefully the location of all of these hardened bases, and exactly what the effect would be should we be attacked. The prevailing winds in those areas would naturally tie in with an attack and its effect upon our population.

As you well know, General, this committee for a number of years has been vitally interested, we have had you before us, and we have visited you out in Omaha at one time with respect to civil defense, and we still have a deep interest in it. I would expect that members of the staff would have more questions they would like to ask with respect to this than I have.

Mr. HOLIFIELD. Mr. Kilgore.

EFFECT ON MINUTEMAN OF CESSATION OF WEAPON TESTING

Mr. KILGORE. General LeMay, I, too, would like to commend you for what I think is a fine statement and it is very much in consonance with the views of this committee with respect to the importance of civil defense.

In connection with the Minuteman program, and the concept of mobility for it that you spoke of, I would like to ask you a question which you may not care to answer in public hearing and, if so, I certainly understand, but I am curious about whether the matter of continued testing or continued cessation of testing of atomic weapons has any direct bearing upon the Minuteman program or the development of a Minuteman missile?

General LeMay. I think I can give an unclassified answer as to the problem. Naturally, if we stop testing atomic weapons it has an effect on all future weapons systems we might want to place in our inventory in that without testing we cannot guarantee progress in the weapons field.

As far as the Minuteman itself is concerned, we can go ahead and complete the development of the carrier portion of it, using weapons that we already have.

I should say warheads, rather than weapons.

Mr. KILGORE. The question of testing becomes a significant matter from a civil defense standpoint. Obviously you balance on the one hand the matter of how much fallout and increase in radiation worldwide may result from testing, as contrasted on the other hand with what might be the anticipated results in the development of a more efficient warhead from the testing and with the development of more efficient warheads how that may directly bear on our capacity to maintain a deterrent force.

In that scope—let me ask a further question with the same reservation that if your answer shouldn't be made in open hearing I understand it, of course—the other question being whether there might be expected to be any material increase in the capacity of the Minuteman as a weapon, if testing were to continue, in order that a more efficient or effective warhead might be expected to be developed for the Minuteman?

General LEMAY. The answer to that is "Yes." If we would go ahead with a testing program we certainly would get more efficient warheads and that would add to the efficiency of the Minuteman.

Mr. KILGORE. I think that is all I have.

General LEMAY. I would like to add in case there might be a misunderstanding, we already have a warhead for the Minuteman so that this can be completed, and we will have a Minuteman which is an effective weapons system. However, it could be more effective as time goes on if we could continue testing and thereby producing a more efficient warhead.

The same thing is true with the rest of the Minuteman, too, if we couldn't test it any more or develop it further we would stand still.

Mr. KILGORE. I didn't intend the question to imply that should there be no more testing that it would stop the program. I understand your answer to be that without further testing there can be an effective and efficient weapons system in the Minuteman, but with further testing there could be a more efficient warhead and, hence, weapons system.

Mr. HOLIFIELD. I think your response to that question is entirely correct. The history of our development of warheads has been the gradual reduction in size, cubic size, and also in weight of the warhead, and when you relate that to your propulsion force you are gaining a tremendous advantage over the warheads we had even 5 or 6 or 7 years ago.

In this field of propulsion at the present time, the Soviets have greater thrust than we have in our missiles, and because of that fact they can lift a heavier warhead for a greater distance than we can, theoretically.

Now, we may have enough thrust to lift an effective warhead the distance we want to lift it, and I am sure we do have, but one of the great arguments for continuing testing is to further improve our efficiency of the warhead itself, in relation to size, weight, and in relation to our thrust power.

MILITARY RESPONSIBILITIES IN CIVIL DEFENSE

Mrs. GRIFFITHS. Mr. Chairman.

To what extent, if any, General, does the Defense Department work with civil defense?

General LEMAY. We are working very closely together in all echelons. When I was at the Strategic Air Command I worked with Mr. Peterson, the first head of the Civil Defense Agency. We sent our people to his headquarters, his people came to ours, and this continued close association is going on today.

Mrs. GRIFFITHS. You advised them, of course, against what they must protect, I presume?

General LEMAY. Yes, ma'am.

Mrs. GRIFFITHS. Do you have actually any people who in case of war would be assigned to civil defense? Is there any part of the Defense Department?

General LEMAY. I can't answer that question.

I would think not, as planned now, because in case war would come I would visualize the Civil Defense Agency going out of business and the military forces taking over.

Mrs. GRIFFITHS. You feel in case of war civil defense would certainly be secondary?

General LEMAY. No, I think they would go on with their work, but I think they would probably come under the military forces because I don't think civil defense as set up now has an organization capable of carrying out the job.

Mrs. GRIFFITHS. Do you consider that you would have martial law in case of war?

General LEMAY. I don't know. I think that would be something to be considered after it came about, something that the President might have to consider, and it might possibly be that that would be the solution. But I do know that the strongest organization in this country at the present time to cope with such a large emergency of this sort is the military forces. They have greater resources, better communications systems, a better overall capability for doing it than the civil defense has, for instance, or even the local authorities.

Mrs. GRIFFITHS. If you have any knowledge on this subject, or any opinion, do you feel that the civil defense is relying upon you also, upon the Defense Department, in case of war to take over civil defense?

General LEMAY. I never have asked that particular question, or thought about it before, but I would say that most citizens of the country are certainly relying on the military for some help in cases

like this because they certainly call on us first in case of just a mild disaster such as a flood or things of that sort, and we always reported, of course.

Mr. RIEHLMAN. Would the gentlewoman yield?

Mrs. GRIFFITHS. Yes.

USE OF RESERVE PERSONNEL FOR CIVIL DEFENSE

Mr. RIEHLMAN. You made a very important statement, General, I believe in respect to the military being called upon in case of an attack in this country to take over in place of civil defense.

Some time ago I introduced legislation to set up within the Department of Defense an additional service known as the Civil Defense Act Section of our Defense Department, and we under that bill would provide for the training of all of the people in our Reserve units, and prepare them for this problem of taking over and carrying on the civil defense activities in our country.

How do you feel about that?

General LEMAY. I think the Reserves could make a very substantial contribution in the civil defense field.

Mr. RIEHLMAN. They would be directly under the direction of the Defense Department, and if trouble arose in this country there would be no question but what they would have proper direction, materials, and everything necessary to carry on the problem of civil defense. They would have the training and the background.

The fear that I have had through the years has been that under civil defense we have no real direction. Every person who is under civil defense is a volunteer, under voluntary service. He is not sworn to any specific duty or anything else, so if we are called to duty and he left his family at home, he might feel that he might better go home and protect his family than he would to man a post somewhere.

Were he in the Reserves he would have to carry out the duty and the assignment he was directed to carry out.

General LEMAY. I agree that under military control you would probably get a much more efficient job in case we had such chores to carry out, because of the military control you would have over the people.

Mr. RIEHLMAN. Our committee has for many years, under the direction of our chairman here, made a very careful study of this whole program and from time to time we have been much perturbed about what would happen and what direction our civil defense group would be able to carry out if this country were attacked, and how effective it would be.

General LEMAY. Well, I believe you would get a much more efficient operation if it were military because, in case we do get an attack, you are going to have some unpleasant and unpalatable chores to carry out with these people. You bring up a very good point. What is a man going to do when his family is endangered and he is off someplace else? If he feels his duty is one place, he is going to be there.

This is my personal opinion. I favor militarizing the civil defense.

Mr. RIEHLMAN. This is not very receptive, as far as the Department of Defense is concerned, or it was not when this bill was introduced. We could not arouse any interest on the part of the Department of Defense.

General LEMAY. It is a complicated problem and certainly there are other points on the subject.

Mr. RIEHLMAN. I am sure there are.

Mrs. GRIFFITHS. In case the attack were within the next 24 hours, what is the Defense Department really prepared to do along civil defense lines?

General LEMAY. I can only give you a general answer to that. Wherever we maintain forces, all of them are available to do whatever is necessary in the same manner that they are available for local disasters now. I do not think that the Defense Department at the present time—at least I know of nothing in the Air Force, no plan to take over an overall responsibility for this problem because it is assigned to the Civil Defense agency.

Mrs. GRIFFITHS. We found out yesterday, I believe they have 1¼ persons per county in the United States working on this problem, so that at the present time we really have no civil defense and the Defense Department really isn't trained, either.

General LEMAY. It is very difficult to maintain volunteer civilian interest in a job of this sort. When civil defense first came into being, I was stationed in Ohaha. I know the citizens in Omaha, perhaps brought on by the knowledge that the Strategic Air Command Headquarters was there, and they undoubtedly would be a target in case of war, took a very active interest in civil defense. They had a very good committee headed by Mr. Sam Reynolds, who did an excellent job in preparing civil defense plans. We cooperated with them in every way we could, offered suggestions, and they came out with a very good civil defense plan. They had people appointed, various types of rescue squads needed, and repair squadrons and things of that sort; they knew who was going to be on them, and they actually started a little training program.

But I am sure if you went out there and inspected now you wouldn't find the same degree of efficiency still existing, as they had at their peak.

I don't know this to be so, but I would think that it probably has gone downhill.

Mrs. GRIFFITHS. Thank you.

USE OF NATIONAL GUARD

Mr. HOLIFIELD. Governor Hoegh was before us yesterday, and he did indicate something along the line of what you have said in that he said that approximately two-thirds of the National Guard units were going to be under the control of the Governors, and unless it was an extreme military emergency they would not be called into service by the Federal Government. He indicated, I think, some 6 or 7 divisions were subject to immediate call, and something like 20 divisions would be left in the State, subject to the direction of the Governor in aiding in the civil defense emergency.

This seems to me as an individual to be a proper function of the National Guard, and I am also in accord with Congressman Riehlman's thinking that probably there should be more thought about the Reserves assuming this function.

(The following material was subsequently received:)

HOUSE OF REPRESENTATIVES,
MILITARY OPERATIONS SUBCOMMITTEE OF THE
COMMITTEE ON GOVERNMENT OPERATIONS,
Washington, D.C., March 28, 1960.

Hon. THOMAS S. GATES, Jr.,
Secretary of Defense,
The Pentagon, Washington, D.C.

DEAR MR. SECRETARY: The Military Operations Subcommittee is engaged in a study of civil defense planning and the current status of protective shelter construction in the United States. The Office of Civil and Defense Mobilization and various Federal agencies carrying out civil defense functions delegated by the OCDM have been asked to present oral testimony to the subcommittee on this subject.

It would be helpful if the Department of Defense would submit a statement for the record summarizing the civil defense responsibilities of the three military services and the use of protective construction, including specifically:

(1) Adjustments in the roles and missions or functions of the Armed Forces relating to civil defense requirements.

(2) Significant changes in doctrine and operating concepts with respect to the use of protective construction in the event of nuclear war; and

(3) Progress in developing protective construction since the Department's testimony to the subcommittee in May 1958.

Material submitted should be in a form suitable for inclusion in the printed record of the hearings.

Sincerely yours,

CHET HOLIFIELD,
Chairman, Military Operations Subcommittee.

ASSISTANT SECRETARY OF DEFENSE,
MANPOWER, PERSONNEL, AND RESERVE,
Washington, D.C., April 19, 1960.

Hon. CHET HOLIFIELD,
Chairman, Military Operations Subcommittee,
Committee on Government Operations, House of Representatives.

DEAR MR. CHAIRMAN: In accordance with your request of March 28, 1960, there is enclosed a Department of Defense statement for your use in connection with the hearings on civil defense being conducted by your committee.

The statement has been prepared in two parts. Enclosure No. 1 provides a summary of the responsibilities of the three military departments and their functions (item 1) of your request. Enclosure No. 2 contains the information requested by items (2) and (3) of your recent letter. The material furnished is based on the assumption that your request applied only to personnel shelters.

We will be happy to furnish any additional information on this subject that you or your committee might require in the future.

Sincerely yours,

CHARLES C. FINUCANE.

ENCLOSURE NO. 1

DEPARTMENT OF DEFENSE STATEMENT ON RESPONSIBILITIES AND FUNCTIONS OF THE MILITARY DEPARTMENTS RELATING TO CIVIL DEFENSE

Modern warfare has created a condition wherein the entire resources of the Nation must be included in defense plans. Civil defense and military defense are highly interdependent; a weakness in one may lead to weakness in the other, a failure in one may lead to a failure in the other.

The Department of Defense fully supports the need for a strong civil defense as an inseparable part of our total posture of national security which has the objective of preserving our people and their fundamental values and institutions. Our strategy and that of our allies is one of deterrence. Our purpose is

to make clear that aggression against us cannot profit the aggressor. Our military power, our ability and will to prevail, together with civil defense measures, provide that deterrence. Therefore, it does not appear prudent to neglect the civil defense mission because without it our national security as well as our national strategy becomes incomplete.

Today, and until armaments can be reduced with adequate safeguards, adequate military power is essential to our efforts of assuring peace. To deter an attack against us we must have military power, and the will to use that power if need be, that is sufficiently flexible to meet appropriately the range of threats available to an aggressor. The combat readiness of our Army, Navy, and Air Force and the military forces of our allies provides strong deterrent power. It must continue strong in the future and a strong civil defense program is an increasingly important part of our deterrent posture. Such a program will strengthen the conviction and credibility of our firm resolve to meet aggression with force. If our policy of deterrence should ever fail, then military power and civil defense are our assurance of survival and of prevailing.

Civil defense must remain under civil authority in accordance with the policy and intent of the Congress expressed in the Federal Civil Defense Act of 1950, as amended. Civil government at all levels must prepare itself now for the accomplishment of its assigned emergency mission with its own resources. In the initial phases, following a nuclear attack, our national recovery effort would be of necessity decentralized, depending on the circumstances, down to the local community. Most of the larger communities in the United States include military units either active or reserve. Some military units, due to circumstances, could not immediately be employed in their assigned combat role, and could therefore be employed under military control to assist their community or other communities in their recovery effort. In this respect, it is also important to remember that many of our military installations would also receive severe damage and require a recovery effort on the part of our military forces. Accordingly, it is considered to be of the utmost importance that all elements of civil government provide such an effective civil defense program that, except for local cases of extreme damage, they will not be compelled to rely on military assistance in accomplishing the civil defense mission.

The "National Plan for Civil Defense and Defense Mobilization," published in October 1958, sets forth the responsibilities of all levels of government, industry, and the public relating to civil defense and defense mobilization. Annex 7, thereto, "The Role of the Military" supports and amplifies the national plan by setting forth the responsibilities and procedures of the Armed Forces of the United States in assisting civil authorities in both civil defense planning and emergency wartime operations.

Military support to civil authorities in civil defense operations is an emergency task within the mission of all Federal active duty and Reserve units of the military services, to be performed when essential military requirements will permit. Inherent in the acceptance of this task by the Department of Defense are these two basic principles:

1. In the event of an attack on the United States, active defense of the Nation, offensive combat operations, and immediate deployments and essential preparations therefor, will be the paramount and most immediate tasks of certain U.S. Armed Forces. Also, certain other military manpower and materiel resources will be required for the support of these defensive and counteroffensive actions.

2. Military resources other than those in 1, above, can be made temporarily available to assist the civil authorities in civil defense operations, provided that:

(*a*) Such support does not interfere with the essential military mission.

(*b*) Resources thus committed will be responsible to military command and remain under military control (with the exception of consumable items, such as food, fuel, and clothing) and will be subject to recall to meet the operations requirements of the military mission.

Military resources are acquired by the Department of Defense to meet operational and support requirements which are levied by the military mission of the Armed Forces. Priority claim on military resources for military purposes prevents their precommitment for nonmilitary purposes. The earmarking of military units for a primary civil defense role is infeasible because the pattern and effects of attack are unpredictable. Thus, such predesignation of forces might wastefully divert military resources from performing the basic task of our Armed Forces—to carry the war to and destroy the enemy who is the

source of attacks in the United States. Military assistance is complementary to but not a substitute for civil participation in civil defense. It would, therefore, be extremely hazardous to assume that the military could meet a substantial share of the civil defense requirements while simultaneously conducting necessary military operations. An effective civil defense plan must include the civil population at large in civil defense operations to assure the survival of the Nation and its military power.

The present condition of international tension requires continuous action to keep the manpower mobilization base at a maximum level for any contingency. Effective manpower mobilization means not only a proper military manpower buildup but also proper defense support from the civil economy, including proper civil defense support.

While the military must be prepared for prompt and vigorous action in the event civil law-enforcement agencies are unable to cope with a situation requiring emergency military assistance for the maintenance of law and order, short of martial law, it will be provided as a supplement to, rather than a substitute for, State and local law-enforcement agencies and will be rendered through those agencies. Such emergency military assistance will be withdrawn promptly when it is evident the need no longer exists.

Martial law will not be imposed except when the agencies of the civil law have been paralyzed, overthrown, or overpowered and are unable to operate and function adequately. Martial law cannot be imposed without specific executive authorization. Priority will be given to support civil authorities in maintaining law and order. In areas where martial law has been declared by the President, the military authorities will perform all acts reasonably necessary for the restoration and maintenance of public order, until such time as it is determined that the appropriate civil authorities are able to operate and function adequately.

Appropriate Department of Defense directives have assigned specific responsibilities in civil defense to the military departments including the responsibility for the development of emergency plans.

The primary responsibility for coordinating the planning and coordinating and controlling the rendering of military assistance to civil authorities in domestic emergencies is that of the Department of the Army. The Departments of the Navy and the Air Force are responsible for rendering such assistance, consistent with the requirements of their primary mission, as may be deemed necessary by the Zone of Interior Army Commander or appropriate higher authority.

The military departments' emergency plans are designed to cope with any foreseeable contingency; they include provisions for emergency assistance, consistent with the execution of the primary military mission, to local and State government authorities in civil defense emergencies wherein civil authorities are incapable of operating without this support. These plans are coordinated with Federal, State, and local civil defense plans to a degree consistent with military security requirements. The heavily populated areas of the United States receive the most attention in planning for military support during civil defense emergencies.

Military planning, training assistance, and operational liaison are provided to civil authorities at all levels in order to assist in the attainment of an adequate capability for civil defense operations. The military installations distributed throughout the United States often have common problems of defense and protection with adjacent communities under civil government. Coordination of planning, for protective measures before attack and recovery measures after attack, between civil authorities and the military services is necessary to avoid conflicts. Local coordination permits the military commander to respond quickly to civil defense emergencies, if the military resources can be made available for that purpose.

Mutual support during emergency conditions must be the guiding principle for both the military plans and civil defense plans.

Included in the membership of each OCDM regional civil and defense mobilization board are Department of Defense representatives from the Army and assistant representatives from the Navy and Air Force. This representation is mutually beneficial to the Department of Defense and OCDM in civil defense and defense mobilization planning.

The training program for both Active and Reserve military forces in domestic emergency operations is designed to provide for prompt assembly and employment of forces in an emergency operation. A major objective is to improve the procedures by which military skills can best be employed in the emergency.

Generally, the skills available within the services are well suited to disaster operations and frequently training is necessary only as an extension to that received for the basic skill possessed by the individual. However, personnel are given basic indoctrination in atomic, biological, and chemical warfare, and the characteristics and effects of natural disaster. The training of commanders and staffs is given particular emphasis.

The National Guard forces which are not in the active Federal military service are available to the State Governors for support of civil defense operations, and remain under State control until ordered or called into active Federal military service.

The use of the Armed Forces Reserve components during domestic emergency operations and when called or ordered to active duty is governed by the same concepts that apply to Regular forces. It is the mission of the Reserve to provide trained units and qualified individuals to be available for active duty whenever necessary to meet the requirements of the Armed Forces of the United States in excess of those of the Regular components.

Other aspects of civil defense generally considered to be the collateral responsibilities of the Armed Forces include the furnishing of information and reports to the Office of Civil and Defense Mobilization with respect to attack warning and nuclear detonations, radiological fallout, aerial reconnaissance, and Conelrad.

In addition, the Department of Defense provides the Office of Civil and Defense Mobilization with information relating to anticipated forms of attack and defensive procedures. This assistance includes guidance as to likely attack areas. OCDM has access to data on nuclear weapons effects not related directly to military operations. Direct liaison between OCDM and DOD (Defense Atomic Support Agency) facilitates the exchange of this type of information.

Technical advice and assistance is provided OCDM in passive defense planning in the biological, chemical, and radiological fields, and in the development and testing of survival equipment.

ENCLOSURE NO. 2

DEPARTMENT OF DEFENSE STATEMENT ON PROTECTIVE SHELTER CONSTRUCTION

1. Significant changes in doctrine and operating concepts with respect to the use of protective construction in the event of nuclear war

The doctrine of the Department of Defense on protective construction in general was formalized by directive and instruction in 1956 and has been implemented by memorandum, instruction, and planning documents by the various military departments. This doctrine, as it relates specifically to personnel protection, provides for a level of protection comparable to that established by the national policy on shelters which was announced by Leo A. Hoegh, Director, OCDM, in May 1958.

Within the scope of action under the national policy on shelters, operating concepts are continually being sought, discussed, and pursued to tentative conclusions. At the present time, these concepts have had little effect on doctrine and policy.

2. Progress in developing protective construction since the Department's testimony to the subcommittee in May 1958

The Department of Defense has prepared a document for internal use entitled "Protective Construction Review Guide." This will provide a systematic procedure for integrating the essential strategic, operational, and engineering factors which must be considered in developing a program from the inception of the requirements through the determination of the required degree of protection to the construction of the necessary facility. The Department of Defense is giving attention to the practical aspects of a fallout shelter plan for military personnel and dependents at military installations. Actual construction progress will be dependent upon resources available as weighed against necessary operational requirements.

A. *The Department of the Army.*—The Army, recognizing that passive defense preparedness is essential to the success of a deterrent strategy, has recently completed an exhaustive study aimed at improving the passive defense measures for the protection of Armed Forces. This study was undertaken in considera-

tion of the posture the Army must maintain to fulfill its responsibilities in the prosecution of a war as well as the provision of support to civilian recovery operations. The results of the study provide a basis for important actions related to such matters as continuity of command, emergency survival needs, planning and operations, protection, dispersion, etc.

Consistent with Department of Defense policy Army installations in the continental United States are, for the most part, utilizing on an improvised basis the protection to personnel which is afforded by basements, masonry constructed buildings, and other structures such as the casemates of old coast artillery sites. The underground magazines in the launching areas of certain Nike sites also provide a significant measure of fallout protection for the crews while not in action. In some cases, facilities have a built-in resistance to fallout effects because of the nature of the mission conducted—i.e., explosive industry.

In planning for the utilization of protection afforded by existing structures, personnel have been assigned shelter areas, and indoctrinated relative to emergency signals, routes, etc.

Wide distribution of home fallout shelter designs developed by OCDM has also been made.

Minimum fallout protection for operating personnel has been incorporated in the construction design of two major communications facilities while another hardened facility is being constructed to conduct machine analysis of postattack capabilities of ordnance industrial resources.

As a result of the passive defense study mentioned previously, all installations have been included in an "order of priority" for future protective construction projects for the CONUS Army.

B. *The Department of the Navy.*—Following detailed evaluation of the results of full-scale tests on personnel shelters, the Navy is now proceeding with preparation of standard designs for those structures which appear to be the most promising. The ultimate objective of this standardization program is to have available a family of shelter designs for the Navy ashore, ranging from fallout types at one extreme to highly resistant blast shelters at the other. Once the designs are completed, plans include stocking certain components of the shelters—these components can then be issued as a package when required. To date, an underground group shelter, corrugated steel arch, 25 by 48 feet adapted from the standard ammunition magazine, provides protection for 80 to 100 people for a 2-week time period, and an underground group shelter using parallel lines of corrugated steel or reinforced concrete cattle pass or pipe sections connected by reinforced concrete headers containing entrances and utilities will provide protection for from 50 to 75 people for a time period of 2 weeks.

A new blast closure device has been especially developed for personnel protective shelters, and prototypes of two sizes are being tested.

The Naval Radiological Defense Laboratory, under a project sponsored by OCDM, has conducted a series of habitability studies of a modification of the standard 100-man Navy semiburied shelter. Also, the effects of a firestorm on the interior atmosphere of the shelter are being investigated. Thus far, the tests have shown that the structure can accommodate 100 persons for a 2-week time period without undue strain.

A construction contract is being processed for the erection of one of the standard underground metal arch shelters at the National Naval Medical Center. This is a 25- by 48-foot buried shelter designed for 80 to 100 people for 2 weeks' stay time. It is planned to test the equipment and design criteria by having personnel occupy the structure to determine adequacy of air supply, water storage capacity, humidity, etc. A special feature to be studied is a sand filter of German design. Upon completion of these tests, this structure will be turned over to the National Naval Medical Center for use as a personnel shelter.

The Bureau of Yards and Docks publication, "Personnel Protective Shelters and Protective Construction," has been revised to include the latest data in weapon effects and shelter design. This publication concerns itself with weapon effects, weapon characteristics, means of protection, categories and classes of protection, targeting, attack and disaster considerations, design and constructive considerations for protective construction, equipment, and protective shelter. Also covered in more detail than heretofore is the design of utilities, entranceways, appurtenances, and foundations.

C. *The Department of the Air Force.*—A study was initiated of Air Force definitive designs to determine which designs could be modified most economically to provide fallout protection. The principal method of accomplishing this was

by the inclusion of functional basement areas, which would also serve as personnel shelters. The types of facilities which have been studied are hospitals, chapels, headquarters buildings, dormitories, and service clubs.

SAC has been authorized to construct a pilot model fallout shelter at Offutt Air Force Base, Nebr. This will be a 100-man shelter located within the KC–135 operational area. Completion is forecast for May 1960 and upon completion, SAC will conduct equipment tests and personnel physiological and environmental studies under Air Force operational conditions. This structure will be a corrugated arch 15 by 81 feet, buried with the arch top at grade level but with 4 feet 6 inches of earth mounded over. Mechanical ventilation, a gasoline-powered motor-generator set, water storage, and chemical toilets will be provided.

Using data developed by the Corps of Engineers, Naval Radiological Defense Laboratory, and the Office of Civil and Defense Mobilization, a draft of a pamphlet on design and construction of fallout protection has been developed. Publication is forecast for May 1960. This publication will become a part of the 88 series of Air Force pamphlets which outline approved criteria and standards for the design and construction of Air Force facilities.

NATURE OF MODERN WAR

Mr. HOLIFIELD. I would like to ask your opinion on the type of war that would occur in the forthcoming missile age, given an attack by any nation upon another nation. Would the kind of war be such as we have had in the past, lasting for a period of several years, or do you think, with the capacity of these weapons that we have now and the ability to deliver them without military defensive tactics being able to stop them, that the war would be a short war?

General LEMAY. Well, Mr. Chairman, I can't read the future any better than anyone else. I would think, however, that with the weapons systems that are in existence at the present time that if we got into a general war that it couldn't last very long. That is, the decision probably would be rendered very quickly and maybe sporadic fighting, and things of that sort, guerrilla-type attack, would go on for a period of time afterward, but large-scale fighting, I think, would be over in a reasonably short period of time.

Mr. HOLIFIELD. Without trying to pin you down to a time period, would it be reasonable to say it would be a matter of days, or possibly a week or so, maybe 2 or 3 weeks, rather than a matter of 3 or 4 years, as in the case of World War II?

General LEMAY. I think so. With the destructive power of the weapons in existence, the destruction would be so great that you wouldn't have the resources to carry out the large-scale fighting after such an attack.

Mr. HOLIFIELD. Then your thought would be that for all practical purposes the war would have to be waged with a force in being and in a position to retaliate immediately?

General LEMAY. That is correct. I don't think you will have time to build up any forces, call them to active duty, train them, and equip them, and things of that sort as we have done in the past.

Mr. HOLIFIELD. This would fall in line, then, very closely with Congressman Riehlman's bill, the intent of his bill, which would be to use the Reserves in the area where they are already living and for the purposes that would be needed in view of the fact that there would be little likelihood that we would have months to call men into military units and organize them in a military way, and transport them, as we did in wars of the past?

General LeMay. That is true, but that doesn't mean we can't have home Reserve units trained up to the point where they could immediately come to active duty and participate in a general way.

However, as I see it, the trend is going to be away from the direct combat participation because of the expensive and complicated weapons systems coming into the program now. The Atlas, Titan, and the other complicated weapon systems are so costly and complex that we just cannot stand the inefficiency of putting part-time people on them. We are having troubles keeping the training up of people we have 7 days a week.

I see the trend of the Reserves and the National Guard away from such weapons systems and more into the support area, which is just as vital. They will be playing on the defense team, the same as anyone else, but they will be making their participation in other ways.

EFFECTIVENESS OF CIVIL DEFENSE PROGRAM

Mr. Riehlman. I just want to make this comment: I wouldn't want the record to stand in any respect that I didn't feel we had a program for civil defense in this country. I think Governor Hoegh has worked very hard to bring into being a program and would like to have it be an effective program. The great question that I have is whether or not, dealing with all civilians in this Nation, and volunteers, whether or not in the case of emergency it will be an effective program. That is the thing that bothers me. I want to make that very clear, Mr. Chairman, on the record.

FALLOUT DUE TO MISSILE BASE SITING

Mr. Holifield. General, you have testified that an attack might well run from 10 to 30 times the attack on an unhardened site.

Has the Air Force calculated the increased fallout that would occur in terms of both the quantitative amount of the megatonnage and the intensity and the downwind spread of the radioactivity Has the Air Force actually calculated these results?

General LeMay. We have looked at the fallout that might occur from various types of attacks, and this was included, yes.

Mr. Holifield. We have noted in the public announcements of the location of sites that some of your sites are upwind from cities, such as Kansas City and Omaha, to mention two, rather than downwind. I use upwind and downwind in the sense that the winds are from the west to the east, generally speaking.

General LeMay. You are upwind and downwind from some place wherever you go.

Mr. Holifield. That is true. It is much better to be downwind than upwind from the centers of population.

General LeMay. When you are upwind, somebody else is downwind. The answer is "yes," we have considered all of that and come up with a solution to the problem—and it is a compromise, that is granted. That we have been able to do.

OCDM RESPONSIBILITY TO RECOMMEND SITES

Mr. HOLIFIELD. Has the Air Force recognized the increased intensity that would be downwind from hardened bases to the extent that they have recommended the hardening of civilian populations downwind, specifically in areas which would be affected by heavy attack?

General LEMAY. I don't know that the Defense Department has ever made any such recommendation. However, I would think that this would be more properly a recommendation of the Civil Defense agency.

Mr. HOLIFIELD. It would be if they were aware of the increased danger. I am not sure that they are aware of the resulting increased danger.

General LEMAY. I can't say positively that they are aware of it, but let me say we have certainly been working with them closely enough that they should be aware of it.

COST OF HARDENED SITES

Mr. HOLIFIELD. What is the major cost of hardening a missile site as compared to a soft site?

General LEMAY. I would rather have one of my budget people answer that.

STATEMENT OF COL. DUWARD L. CROW, DEPUTY DIRECTOR OF THE BUDGET, DEPARTMENT OF THE AIR FORCE

Colonel CROW. It would cost us about $15 million more to go the hardened route than to use the soft.

Mr. HOLIFIELD. $15 million per squadron?

Colonel CROW. Per squadron; yes, sir.

Mr. HOLIFIELD. What does it cost per soft site per squadron?

Colonel CROW. About $133 million, all told.

Mr. HOLIFIELD. You are telling the committee there would be only $15 million difference between 133 in the soft site and the hardened base?

Colonel CROW. Yes, sir.

Mr. HOLIFIELD. Per squadron?

Colonel CROW. Yes, sir; but it is not quite that simple because our first squadrons are the soft squadrons, and the later squadrons would be the hardened squadrons, and would not only incorporate the hardening but also additional improvements, so you just cannot substract the 15 from the figure I gave you to come up with the cost of a hardened squadron.

COST OF ATLAS BASE

Now, the figure of 133 which I gave you is the cost for the initial soft Atlas squadron. The later hardened improved squadrons will cost about $152 million.

Mr. ROBACK. For the Atlas?

Colonel CROW. That is for the Atlas.

Mr. ROBACK. What is the percentage increase? There has been a figure reported to a Senate committee that hardening increases costs by 10 percent. Is that a reasonable figure?

Colonel CROW. Yes, sir; if you consider the figure of 133—I gave you 15. Ten percent of 133 is 13.3, so in order of magnitude, 10 percent is a fair figure. It would probably be a little bit on the low side.

Mr. ROBACK. You are referring to Atlas sites?

Colonel CROW. I am referring to Atlas sites and the figures are comparable for the Titan also.

COST OF TITAN BASE

Mr. ROBACK. Are they higher for the Titan?

Colonel CROW. They are roughly the same.

Mr. ROBACK. Are the figures classified for cost on the Titan bases?

Colonel CROW. In the aggregate, considering a squadron without specific identification; no, sir, they are not.

Mr. ROBACK. What are those cost estimates for the Titan hardened?

Colonel CROW. The hardened Titan is about $138 million.

General DONNELLY. There will be no soft Titans.

COST OF MINUTEMAN BASE

Mr. ROBACK. What are the relationships with regard to the Minuteman?

Colonel CROW. The hardened Minuteman will cost about $58 million.

Mr. ROBACK. There will be no soft Minutemen but there will be mobile Minutemen?

Colonel CROW. That is correct.

General DONNELLY. That is right.

Mr. ROBACK. What will be the difference in costs?

Colonel CROW. We hope to get the mobile Minuteman squadron at about the same cost we will get the hardened because we are in a position to trade off the hardening cost for the additional equipments that would be required for the mobile and additionally if we can lease part of the railway equipment it will reduce our initial capital investment so we hope to be able to come out about the same.

Mr. HOLIFIELD. Then would this mean that a mobile Minuteman squadron would have approximately the same firepower as a hardened Atlas squadron?

Colonel CROW. I think that is a rather difficult comparison to make, sir.

General LEMAY. Initially, I would say "Yes, sir," but initially we have no actual operational experience in operating these missiles, so we really don't know yet how many missiles we should have to get the most efficient use of the overhead we might have in squadrons and larger units. The same thing is true of putting them on trains. I would say that probably the mobile squadrons would have less firepower than the fixed squadrons. It will probably be a little harder to control them, requiring more overhead and you soon run out of efficient use of the overhead, so you would probably want a smaller number of missiles in the mobile units.

PLANNED DATES OF MISSILE READINESS

Mr. HOLIFIELD. I am not sure that my question is proper, although I think probably the answer, if not given now, will be given from time to time before public congressional committees, and be printed—in some instances it has already been printed.

My question would be about the time period within which we hope to have our Atlas bases hardened—1965 or 1971? What is the year?

General LEMAY. Before then.

Colonel CROW. It would be considerably earlier than that. The dates, of course, would be classified.

General DONNELLY. We would like to keep it classified, but it would be considerably earlier than the 1965 time period.

Mr. HOLIFIELD. Let me ask you to relate that time period, whatever it might be, to the time period in which your mobile Minutemen will be available.

Colonel CROW. It would be roughly a year earlier.

Mr. HOLIFIELD. Most of your ICBM squadrons have been announced as being located on SAC bases. Is there any bar to placing any of these squadrons on an Army or Navy base if they were located in better areas?

SITING OF MISSILES AT SAC BASES

General LEMAY. I would say there is no bar. It depends on the facilities that exist on the base.

Mr. HOLIFIELD. Your SAC complex, of course, is quite a big complex, and it does have a mission at the present time, and will have for the interim period of handling the SAC planes and the SAC support.

The question I am asking is related to the fact that you will in effect be concentrating two types of activity at a single base.

General LEMAY. The missile activity is concentrated there, but only the support phases of it. The missiles, themselves, are not on the base. They are dispersed in the area.

Mr. HOLIFIELD. You use the same support facilities for the SAC bombers in general as for the missiles?

General LEMAY. That is correct. You require machine shops, barracks space, communications, and things of that sort.

Mr. ROBACK. What about the airfield? Do you require the airlift capacity which only a SAC base provides?

General LEMAY. Airfields in the vicinity are useful to bring missiles in quickly from the production source, and things of that sort. They are useful for bringing spare parts in to repair missiles that are out of commission. In other words, using airlift instead of stocking a vast quantity of these very expensive items. An airfield is useful. Certainly you don't require an airfield as extensive as you require for Strategic Air operations.

Mr. ROBACK. In a statement made to the House Appropriations Committee by the Air Force, all SAC bases have facilities for the missile squadron, and the intention was to provide logistic support at each base which required that type of airlift facility.

General LEMAY. That is not so.

Mr. ROBACK. Let me read that sentence:

To provide the capability most economically, missile squadrons should be located on or near existing Defense Department installations having flying facilities capable of accommodating the heavy cargo airlift.

Does that make sense?

General LEMAY. That is correct, but certainly you can accommodate heavy cargo aircraft in fields other than Strategic Air Command fields.

Mr. ROBACK. What I mean is, is it essential or is it desirable to have airfields capable of handling heavy cargo planes?

General LEMAY. I would not say that it was absolutely essential. There are some places where we could truck these missiles into the sites from the factory, or ship them on railroad cars, and things of that sort. I couldn't say that it was absolutely essential.

Mr. ROBACK. It is a fact, is it not, in any event that all your SAC bases are missile bases, planned or actual?

General LEMAY. I don't think that is so.

General DONNELLY. No.

Mr. ROBACK. Let us put it the other way around, that all missile bases are chosen or located at SAC bases.

General LEMAY. Well, they are all located at SAC bases because all of our intercontinental missiles belong to the Strategic Air Command, and they are all SAC bases.

Wait a minute, I think I understand what you are getting at, now. You are trying to say we have located all of our missiles quadrons at Strategic Air Command flying activities. Is that what you are getting at?

Mr. ROBACK. I read that in the testimony to the Appropriations Committee.

General LEMAY. My answer is: "No, we have not." At the present time we have announced that we are going into Lowry Air Force Base, which is a training command establishment, not SAC. We are also going into Warren Air Force Base, which is an old Indian fighting post, and has no flying field at all there.

Mr. ROBACK. So heavy cargo airlift would not necessarily be a consideration?

General LEMAY. It is a consideration, yes. We try to do it the best way, and having air access to these activities is certainly desirable, but I wouldn't say it was absolutely mandatory and essential in every case.

Mr. ROBACK. Very good.

Now when you talk about criteria for selection of bases to accommodate certain criteria, for example, to minimize fallout, if possible, you are talking only about selection of available SAC sites?

General LEMAY. I was not. We looked at every site. Every possible site.

Mr. ROBACK. Do you have any site on which a missile is or will be located that is not a SAC site?

General LEMAY. Say that again.

Mr. ROBACK. Do you have any fixed missile installation that will be located off a SAC site?

General LEMAY. Yes.

Mr. ROBACK. Which one?

General LEMAY. Lowry, Warren, those are the two that have been announced, and those two bases were not SAC bases. Warren, I think, is now, but——

Mr. ROBACK. Are they under the control of the Strategic Air Command?

General LEMAY. Warren is but Lowry is not.

Mr. ROBACK. Will it be transferred to the Strategic Air Command?

General LEMAY. It may. I don't think it is contemplated at the present time.

Mr. ROBACK. Is that the only installation that is not in the Strategic Air Command upon which missiles will be sited?

General LEMAY. They are the only ones that have been announced—Lowry and Warren.

SHELTERS AT MISSILE BASES

Mr. HOLIFIELD. General, may I ask you if there have been any steps taken at any of your missile sites to provide shelter protection for nonoperational personnel and civilian dependents at these bases?

General LEMAY. No.

Mr. HOLIFIELD. There has been no program to place them in underground shelters? They are considered as expendable as the rest of the population?

General LEMAY. I wouldn't put it that bluntly; no. We have evacuation plans that I think are quite well along and practical. We have exercised them. I think we have gone far beyond what the normal activity has been around the area. The last civil defense exercise that I looked at out in the Omaha area I looked at from the air just to watch the traffic flow and the routing, and so forth. We evacuated Offutt completely with the exception of the essential personnel we had to have. All the dependents went, not only the people living on the base, but the great percentage of the force living off the base.

My observation at the time was that we were about the only ones interested enough to participate in the exercise.

Mr. HOLIFIELD. And you did evacuate most of the nonoperational personnel?

General LEMAY. All of the nonoperational personnel.

Mr. HOLIFIELD. Where did you evacuate them to?

General LEMAY. We had a prepared place.

Mr. HOLIFIELD. Above ground?

General LEMAY. Above ground.

Mr. HOLIDAY. And without shelters?

General LEMAY. Yes; shelter, but not shelter against substantial radiation. Not underground shelters.

CIVIL DEFENSE SHELTERS

Mr. HOLIFIELD. You have stated that you are hardening your missile sites so that the missiles will survive an enemy attack. I think you have made a very good case for the necessity of it.

I ask you if you think that our population should be hardened so that they will survive an enemy attack?

General LEMAY. I answered that, I think, in my statement here, to the effect that if you harden the civilian population that is certainly something that a potential enemy has to take into account. I don't believe that I would be for a full-scale program of building an antiradiation shelter for every citizen in the country. I think the program should be encouraged, that they should do something for them-

selves along this line. I think we should do something, but I don't believe that I could say that I believe we should have a shelter for everyone.

Mr. HOLIFIELD. Are you familiar with the study that the Joint Committee on Atomic Energy conducted last year concerning a hypothetical attack on this country, in which 263 weapons representing a total of 1,446 megatons were used on 224 targets? Are you familiar with that?

General LEMAY. I have certainly looked at a great number of studies. I don't remember that I actually looked at this particular one.

Mr. HOLIFIELD. I believe the general has one right there. Will you open that up to the map on the seventh day, please. H plus 7 hours, or D plus 2 days.

General DONNELLY. We have D plus 2 days, and D plus 2 weeks. Here is D plus 2 days.

Mr. HOLIFIELD. This is a total of 1,446 megatons, General, and the radioactivity runs from around 5,000 roentgens an hour, on down to zero, of course, in some areas. Now, this attack is, of course, an attack possibly of a magnitude that would occur on 14 hardened bases according to your own formula. And in that particular attack, 50 million people were killed, and 22 million people were injured.

Testimony before our committee at that time indicated that quonset-type shelters 3 feet underground, such as were used in the tests in Nevada, if they were given to those people, would have reduced the fatalities from 50 million to 5 million, and the injured list would go down by a greater proportion.

Now, in the face of that kind of scientific testimony, would you say that the expenditure of $100 per person in the United States would be exorbitant to obtain a saving of 45 million people out of a potential 50 million casualties?

ALLOCATION OF DEFENSE FUNDS

General LEMAY. I don't think the problem is quite that simple, Mr. Chairman. Certainly, you can reduce the casualty rate if you have properly prepared shelters. The shelters cost money.

Mr. HOLIFIELD. It is estimated it will cost between $17 and $20 billion for that type of shelter for the people of the United States, radiation shelters. This is about a 6 months' military budget, for one shot. Six months. Not every year. Not $40 billion a year.

General LEMAY. That is true, but if you spend this money for shelters, I think you have to call that expenditures for defense.

Mr. HOLIFIELD. Certainly.

General LEMAY. Then the question comes of what will give you the most defense. Building holes in the ground to crawl into, or building something to fight with that will add to your deterrent force.

Mr. HOLIFIELD. Does it necessarily have to be either one or the other?

General LEMAY. Not necessarily; no.

Mr. HOLIFIELD. Then, if we would consider adding $5 billion a year to your military budget of $40 billion a year for a period of, let us say, 5 years, in order to have this deterrent effect that a relatively

safe population would have under those circumstances, do you think that would be a good expenditure, or not?

General LEMAY. The amount that you put into it—I am not prepared to answer right off the cuff, now.

Mr. HOLIFIELD. Let us take the testimony of the scientists and engineers who have calculated this and who have testified—and I am asking you the question, I am not asking you to verify the amount—I am asking you the question that if $20 billion would do the job of making the difference between 50 million casualties and 5 million casualties, do you think, from a deterrent standpoint, that it would be worthwhile to add another $5 billion to the budget each year?

DEFENSIVE VERSUS OFFENSIVE EFFORTS

General LEMAY. That is the question I am trying to answer, Mr. Chairman, and I don't think I would put that much money into holes in the ground to crawl into, that I would rather spend more of it on offensive weapon systems to deter the war in the first place.

In other words, I see any great expenditure for this sort of thing to be what I call a maginot line concept, and I think it is doomed to failure.

Mr. HOLIFIELD. It is not a maginot line, though, to harden your retaliatory power?

General LEMAY. No; that isn't, because you are hardening offensive weapons systems.

Mr. HOLIFIELD. Certainly; but it depends upon complete deterrents, and if that complete deterrence or fear of the retaliation fails, then you are gambling with your population.

In the other instance you would have two strings to your bow; you would have your deterrence, just as you have it now, and you would also have the additional deterrence of a protected population.

General LEMAY. Yes; but when you build shelters you have only passive defense. It is truly a defensive measure. It is not offensive. And history is replete with examples of where people have put all their blue chips on defense and are no longer with us.

COST OF SHELTER PROGRAM

I don't say you shouldn't have any, you should have some, but I question putting $20 billion into the program.

Mr. HOLIFIELD. Over a period of 5 years?

General LEMAY. Over any period of time. I question putting that much money into it without analyzing it to see what you could get with that money on offensive forces, and see whether you wouldn't get more protection for the people by spending the money for offensive systems.

Mr. HOLIFIELD. Certainly, you would get more military defense in case it deters, but if it didn't deter you would be completely naked to your enemies, as far as the salvation of the population was concerned.

I am not asking to take $5 billion off of your military defense. I am asking to put $5 billion on.

General LEMAY. Yes; but as a taxpayer I am still interested in these expenditures, and I think we are spending too much money. We have to reduce our debt, and so forth and so on. You know that as well as

I do, but they are additional expenditures, and if there are any additional expenditures, whether spent in the military or outside of it, as a taxpayer I want to get the most out of them.

Mr. HOLIFIELD. As one who is responsible for voting, as is every other Congressman, some $78 billion a year, I think we are concerned with it, and some $40 billion a year for an offensive and defensive force, why we are all also interested in this.

But I want to point out to you that in World War II we spent in 4 years' time—we went in the hole; we didn't spend, we went in the hole over and above every dollar of our taxes, $208 billion in 4 years—$208 billion, at the rate of $52 billion a year, we ran a deficit for 4 years of World War II, and the Nation stood up under it.

I am not asking for $208 billion, but only $4 or $5 billion for 5 years.

COST OF DETERRENCE THAT FAILS

Mrs. GRIFFITHS. If we were actually attacked, General, at the time the attack started, for all practical purposes, wouldn't every cent we had ever spent for offensive weapons be money down the drain?

General LEMAY. No; I don't think so. If we are attacked—well, if you would make that assumption, then you would be making the assumption that we were building a military force to lose the war with. In the sense that all wars—everyone loses in all wars; yes. We all realize that. But I don't think that all is lost just because we happen to be attacked or are forced into war in the future. I don't believe that at all.

Mrs. GRIFFITHS. But, the moment the attack starts, the offensive weapons are not going to stop the attack. They may retaliate, but they can't stop the attack, can they?

General LEMAY. It depends on how the war starts. If you have a completely surprise attack, certainly you can't stop the first wave. A substantial portion of it will get through. But the war may not start that way. The last one didn't start that way. As a matter of fact, we had a period of a year that we called the phony war, maneuvering back and forth, and things of that sort, before they actually got down to full-scale fighting.

How the next war will come about, no one knows, but there is a possibility of that. I think there is more of a possibility of things like that going on in the future with people realizing the seriousness, now, of full-scale war, than we have had in the past.

Mr. HOLIFIELD. But the capability of waging the full-scale war by surprise attack is completely different today than it was in World War II. In other words, your capability of instantaneous response and instantaneous attack and magnitude of destruction is completely different today than it was then.

General LEMAY. There are different rules, but also for the defense as well as for the offense.

COST OF SHELTER PROGRAM

Mrs. GRIFFITHS. Now, I would like to ask you my second question.

On the day that we are attacked, for the average person in America wouldn't the money have been better spent for a shelter than it would be for you to be able to retaliate? Now, you are attacked. You are under attack. All weapons have been fired. Wouldn't he

be better off with a shelter than he would be to know if he dies that we have put the rest of them out of commission, too?

General LEMAY. I am trying to think of an example I might use. If we are actually attacked, in one respect your military forces have failed you because our primary objective has been to try to prevent war from coming. If we fail, we have failed, yes.

In that case, if you have an attack coming on you, if you could make an instantaneous switch, probably everybody would vote for a shelter instead of a missile, if the things were coming on us. But, unfortunately, you can't operate that way.

If you go back and change your approach to the problem and buy shelters instead of missiles, I guarantee you will get the attack.

Mrs. GRIFFITHS. I don't think we have to do that.

Mr. HOLIFIELD. We are not suggesting that.

Mrs. GRIFFITHS. I don't think the shelter system is really the Maginot line. My understanding was that the Maginot line was to defend the country from attack. Now, nobody suggests that the shelter system will defend you from attack. The shelter system is your last best chance of surviving. It is your survival. It is not defense.

General LEMAY. I have already said that I favor a reasonable shelter program of some sort, but I question the $20 billion. In other words, I think that we have to have some air defense in this country. We do have a reasonable defense. It is not an airtight one. It would cost too much money to get an airtight one. And you have to have some defensive forces in your military makeup. But let us not concentrate on them alone because people who have, found they have lost their battles. You must concentrate the bulk of your resources in your offensive capability.

I consider the shelter program a part of defensive side of the picture. We need some, yes, but let us not put all of our resources in them.

Mrs. GRIFFITHS. Well, I don't even think it is defensive. I think it is merely just giving you a chance to survive. And I think in the long run this is the thing we need. And I would like to say on behalf of my colleague on the other side of the aisle, that I feel the greatest shot in the arm that civil defense has ever been given has been given by the Governor of New York when he suggested a shelter program. And I feel that the President of the United States should point out to the Nation exactly what the problem is. I think then they would be willing to have a shelter system.

Mr. HOLIFIELD. General, I must read to you—in view of what you have said—your principle "c," on page 2 of your statement, where you say:

> We must also provide protection to our population by practicable passive defense measures. Civil defense has the same identical objective as counterforce operations and active defense operations, namely, minimizing damage to our country and its people. Thus civil defense is a vital element of our national deterrent posture and is another factor which must be carefully assessed by any potential enemy in calculating his chances of success.

I want to say this committee certainly believes that and we are not going to consider the word "practicable" as prohibiting defense for the taxpayers. It is my job to extract money from the taxpayers, and I don't want to have the goose who lays the golden egg killed. I want him to pay more taxes so you can have a better defense.

MISSILE BASE COSTS

Mr. KILGORE. I would like to change the subject somewhat and go back to some of the earlier testimony on cost factors in soft and hard bases, and in mobile operation of the Minuteman.

When you talk about a squadron here you are talking about nine missiles to the squadron?

General LEMAY. Ten missiles.

Mr. KILGORE. That is true of the Atlas, the Titan, and the Minuteman?

General LEMAY. No, the Minuteman will have a large number of missiles.

Mr. KILGORE. Do you have any cost figures on the Minuteman program broken down per effective missile, or per missile?

Colonel CROW. Yes, we do. At the present time we estimate it will cost about $1.2 million per Minuteman missile in the hole.

Mr. KILGORE. All the Titan and Minuteman program is hardened if it is a fixed site. The remainder——

General LEMAY. All the Minuteman will be hardened—all the Titan, but not all the Atlas.

Mr. KILGORE. Then is the cost figure of $1.2 million per Minuteman in the hole also related, or is a similar cost figure related to the mobile Minuteman?

Colonel CROW. I indicated earlier that I hoped that we could get the cost of the hardened Minuteman squadron and mobile Minuteman squadron about the same. The mobile Minuteman would probably have considerably larger operational cost and when you take that into account the 1.2 figure per missile would probably be considerably increased.

Mr. KILGORE. The initial cost you would expect to be the same, or lower, I take it from your testimony, but the operations cost in maintaining mobility would be added to——

Colonel CROW. Yes, sir; including your entraining back and forth, etc.

USE OF RESERVES FOR CIVIL DEFENSE

Mr. KILGORE. Going back to this subject that I thought was ably discussed on the concept of the integration of some of the military Reserve Forces into the civil defense program, I had an experience in my own district last summer where several, in this instance Air Force Reserve officers, asked if they could meet with me to discuss the Air Force Reserve program. They are located in an area comparatively remote from any Air Force facility which could provide training to them. It was their view that they recognized that as far away as they were from an existing facility, as great as the changes were since World War II in all concepts of operation of the Air Force, that they had a limited opportunity to contribute to the military effectiveness of the Air Force, and they suggested that they would like very much to be afforded an opportunity, either by the military or by the civil defense program, to have a part of their reserve obligation in the civil defense field.

I think they presented a pretty effective case. They said:

We have, in the period of 15 years since World War II concluded, indicated our dedication to the service by continued participation in the Reserve. We want to continue in the Reserve, we want to do something, and we think we could be effective in the civil defense program.

I just wonder if that wouldn't be true of a lot of the Reserve personnel of all of the military services in the United States?

General LeMay. I think it is true. I think they all feel that they can make a contribution, although they won't say so publicly through their organizations.

Mr. Kilgore. Under different circumstances where the Reserve personnel are physically close enough to existing facilities where they can have mobilization assignments, and where their proficiency can be maintained at a higher level, they can have a very real usefulness to the service in a very quick conversion into an active duty status. And in those instances, the value of the Reserve to the military would be certainly on a different plane. I wouldn't say necessarily a higher order, but on a different plane.

But in these other areas it would certainly seem to me that we have a fairly large pool of people who have had considerable training in command, in communications, in supply, logistics, perhaps who could be integrated into some sort of a unified command, as a local task force in the civil defense program, who could make a very genuine contribution.

Mr. Holifield. But, first, I think it would have to be a real implementation of your item c, there, that the Defense Department itself would have to back up what you say there, that this would provide an additional deterrent.

VALUE OF CIVIL DEFENSE AS ADDED DETERRENT

I wonder what degree of deterrence you think would be afforded in addition to a strong military posture if our enemy knew that the bulk of our population were in a position to survive an attack. What degree of importance would you attach to that area of deterrence, General?

General LeMay. Well, I would give it consideration. How much depends on all the other things that they have done.

Mr. Holifield. Has the Defense Department given—I don't mean casual consideration, but has there been given real consideration to adding to our deterrence by this type of thing?

General LeMay. Yes, sir; I think they have given consideration to it.

Mr. Holifield. Have there been any studies made or any consultations between the Chiefs of Staff on this as an item of important consideration?

General LeMay. Yes, they have considered it in the Joint Chiefs of Staff, and they have made recommendations on the subject.

Mr. Holifield. I assume those recommendations were made to the President?

General LeMay. Made to the Secretary of Defense.

Mr. Holifield. Would those recommendations be available to a cleared committee?

General LeMay. I would think the Secretary of Defense would be glad to make them available, but I am not positive.

Mr. Holifield. We make that request at this time, then, and will you please find out if this committee could have it, even though it is on a classified basis?

Mr. Holifield. Well, I am not sure that it should be, for I believe people who are paying the taxes in this country have a right to know how much consideration is being given to their individual life protection in the case of enemy attack.

General LeMay. I agree with you, but this particular paper has many other things in it besides the things we are discussing this morning.

Mr. Holifield. We are not asking for other things, General.

General LeMay. It is all in the same paper. We can extract out what you are looking for and we can probably declassify that.

Mr. Holifield. We are asking for recommendations in this field, and particularly any data you can furnish us to show that the factor of civilian defense has been given more than casual consideration in the conferences of the Joint Chiefs of Staff and in their recommendations to either the Secretary of Defense, to the National Security Council, or to the President.

(Subsequently, in response to a letter of inquiry, the following reply was received:)

Assistant Secretary of Defense,
Manpower, Personnel, and Reserve,
Washington, D.C., April 20, 1960.

Mr. Herbert Roback,
Staff Administrator, Military Operations Subcommittee, Committee on Government Operations, House of Representatives.

Dear Mr. Roback: Your letter of April 12, 1960, concerning the testimony of General LeMay has been referred to this office for reply.

For the subcommittee's information, there is quoted below the pertinent portion of a recent memorandum from the Joint Chiefs of Staff to the Secretary of Defense on the problem of fallout shelters:

"The Joint Chiefs of Staff have noted that progress has been made by nonmilitary Federal agencies and others toward implementation of the national policy on shelters. In view of this progress, it is now considered appropriate for the Department of Defense to develop a military fallout shelter plan and implementing program consistent with the civilian program and supporting the national policy on shelters. The plan should provide for the protection of military and civilian personnel required for continuity of essential military operations, personnel in troop housing, and dependents of military personnel in Government-owned housing. Appropriate emphasis should be given to protection of personnel in high fallout hazard areas. The implementing program should be synchronized with appropriate civilian programs and should include a suitably phased method of financing, which will not jeopardize the financing of important operational requirements. For this reason each military department should retain the prerogative to weigh individual shelter requirements against other parts of the military construction program. It is considered undesirable and impractical to expect individuals living in Government-owned housing to personally finance the construction of fallout shelters."

If we can be of any further assistance, please let us know.

Sincerely yours,

Charles C. Finucane.

COST OF MOBILE MINUTEMAN

Mr. Roback. With regard to the mobile Minuteman system, did we understand these costs would be higher per squadron than the hardened?

General LeMay. We haven't reached the point where we can give any reasonable, accurate figure on what the cost of a mobile Minuteman system is going to be. Our study to date indicates that it looks like it is going to cost a little bit more.

Now the cost figures on the Minuteman system, since it is a new and complete system, have started out at a low figure, 'way low. For the first time we had a new weapons system coming into the inventory in which the cost was going to be dramatically below the system it replaced. Then as we went along on the program, the cost rose. We took a look at that and were able to bring it back down again.

Now the mobile system is a little behind the fixed system, and the same thing is happening to that. I think we will be able to bring it down. That is the reason the budget man said that he was hopeful it would be around the same cost. I think it will be. But, right now, I can't give you, and no one else can give you an exact figure of what the mobile Minuteman squadron is going to cost.

Mr. Roback. Now can the budget man tell us whether these costs contemplate the operation, the actual crews, and the railway cars, or are you talking now just about the missile hardware?

Colonel Crow. Of course, we have to take into account the cost of operating the train. All of the military O. & M. costs would be related to that.

Mr. Roback. Do your apparently high costs depend importantly upon the fact that you have to design special railway cars, and you have to contract with civilian crews?

Colonel Crow. Special cars would have to be designed, that is true, and we probably would have to have some sort of special contract operation for a portion of it. But, as General LeMay has pointed out, we in effect do not have the experience factors to get precise dollar costs. Again, as General LeMay has pointed out, really the overall selling part of the Minuteman program is the dramatically lower cost, so we are doing everything we possibly can to keep them down.

Mr. Roback. The company selected to put the Minuteman together is Boeing?

Colonel Crow. That is right.

EQUIPMENT FOR MOBILE MINUTEMAN

Mr. Roback. Is Boeing considering how you are going to move these missiles around the country?

General LeMay. That is Boeing's operational program.

Mr. Roback. They have the duty of figuring out what kind of railway cars will carry these missiles?

General LeMay. That is right, and they have subcontracted with the railway people. We don't have to have all special cars. We can have a standard locomotive, for instance. We can have a standard passenger car for the crews. We will probably use a standard car, but with a different interior for communications and things of that sort. We probably can use standard chassis and things of that sort, but with other equipment in it for the missile carrier, itself.

You don't want to carry it around sticking up in the air. You want to lay it down when you are moving. You have to have an arrangement for lifting it. That equipment has to be designed and placed on the car.

Mr. HOLIFIELD. We have had a briefing, General, in executive session from the Hardeman Co., who came at our request and gave us a briefing on the design of the mobile system which I understand they had submitted to the Air Force a year or so ago.

General LEMAY. There are several companies who have been interested in this sort of thing.

Mr. HOLIFIELD. We are familiar in a general way with the equipment that is proposed and the type of rail cars required.

USE OF ARMY TRANSPORTATION CORPS

Mr. ROBACK. In view of the apparent high cost of the mobile system, I wanted to inquire of the Air Force whether any consideration has been given to delegating the transportation responsibilities to the Army Transportation Corps, considering the fact that the Army Transportation Corps and the Army through other departments throughout our history has been a real railroad operator. The Army has railroad rolling stock of at least 5,000 cars. I don't say those would be suitable to haul a missile, but they know something about the railroad business. Has the Air Force considered that?

General LEMAY. Yes. We had planned to use such rolling stock as was in existence, Government owned, for these things.

Mr. ROBACK. You had planned on it? You are planning on it?

General LEMAY. Certainly.

Mr. ROBACK. The answer is a little confusing, Mr. Chairman, because I understood Boeing is in the process of designing special railway cars. Now it may be that some of these cars have to be specially designed, others could be used for transportation of crews, or camouflage, or whatever. You say you are planning to use those cars. Who would have the operating responsibility?

USE OF MILITARY CREWS

General LEMAY. That certainly isn't finalized at all yet. I personally would want to have military crews on these trains.

Mr. ROBACK. You feel like MATS does about civilian airline pilots, you want somebody under military supervision and control and who wouldn't be in a position to strike.

General LEMAY. That is correct. If you want to move you want to move, and you don't want to have to go to the Brotherhood of Locomotive Engineers to say: "Can we move down the track in the middle of the night, instead of waiting until 8 o'clock in the morning?"

From that standpoint, I think you should have military crews. However, you are going to have to operate on the railroads. They are operating for a profit, and you are going to have to coordinate your movements with them. They are responsible for moving the trains, and using the tracks, and certainly you are going to have to have a conductor of some sort, and very close coordination there. A commander of a train, for instance, can't run out on the main line when the 20th Century Limited is due across there any minute. So there must be some plan worked out for the use of the railroads. This is not very far along.

CONTROL OF MISSILE BASES

Mr. ROBACK. General LeMay, you testified with regard to the importance of siting your missiles within the continental United States. One of the issues was sovereignty. Would that same issue apply with regard to Polaris?

General LEMAY. To some extent, yes.

Mr. ROBACK. But you weren't primarily devoting your argument to the case of the Polaris when you were talking about sovereignty?

General LEMAY. Not primarily, although—I don't think I ought to mention this in——

Mr. HOLIFIELD. If it affects oversea bases.

General LEMAY. As it affects oversea bases, yes.

Mr. ROBACK. You say in your testimony that the United States will be a target. Is that an assumption about the enemy's intention or is that a requirement of your deterrent posture, because you have testified both ways. On the one hand, you say we must be in the United States. On the other hand, you say the enemy is going to strike all of these targets anyway. What is the basis for saying that the United States will be a target?

General LEMAY. If you are charged with winning a war against the United States, certainly you are going to attack all of their war-making capability, as well as their military forces. We plan on doing that.

VALUE OF POLARIS MISSILE

Mr. ROBACK. Now, I don't want to promote or encourage any inter-service arguments, but all of us in this room are aware of some of these debates, with many favoring the Polaris system. They are reported in the daily press.

Are you contending that even under a Polaris type of missile and retaliatory system, would the continental area still be exposed in the way you suggested?

General LEMAY. That is correct. If you think you can depend on your enemy to fight the war in the way you would like to have it fought, he will be different than any enemy I have ever faced in the past. It is wishful thinking to think that you can design a type of weapon that you can move out away from your shores and that the enemy will then go over and fight the war over there and leave you relatively safe. No.

Mr. ROBACK. Does that presuppose that the enemy will, instead of trying to knock out the retaliatory forces in the first instance, merely wage a war of punishment against the civilian population? Is that implied in your statement?

General LEMAY. No, that is not implied. I think you are foolish to attack the population, as such.

Mr. ROBACK. Let us say abstractly—many people in the Congress believe, as a matter of general sentiment—that we ought to have a Polaris-type system of retaliation and defense. Suppose we had just a Polaris-type system, for the sake of argument. What would be the enemy's position? Would they, therefore, ignore this system which is presumed to be invulnerable and no longer count on knocking out retaliatory systems?

General LeMay. Well, I am familiar with all of these arguments for the Polaris system and before I start, let me say that I think we should have some of them. I don't believe we should put all of our strategic forces into this weapons system, and for many reasons. I am familiar with all the arguments about how invulnerable this weapons system is. I don't believe all those arguments, either. But let us assume for a minute that they are invulnerable. Now, what is the enemy going to do with its long-range missiles, its long-range bomber force, and so forth? The submarine is invulnerable, and they come to war. That leaves all of that available to hit our warmaking capacity in this country. And don't think we are going to be ignored. There have been too many examples of the United States throwing the balance.

Mr. Roback. The chairman, when he was talking about shelters, considered the condition if deterrence fails. Are you talking about the case if deterrence fails? Have you deserted the deterrence item now?

General LeMay. Yes, deterrence must have failed if we are going to war.

Mr. Roback. Using your terms of reference, then, would it be a greater deterrent factor if you had that sea-based system?

General LeMay. No. I don't think that a sea-based system alone will produce the deterrence that we need.

Mr. Holifield. There will be no guarantee against striking of our cities and our land military bases?

General LeMay. No, and I don't think it would be a deterrence because the Polaris system is going to cost in the neighborhood of at least 10 times the Minuteman fixed system. At least 10 times. And it is not invulnerable at all. I don't think we should discuss that question here in open session, but I bring up one thing that is generally known: It is in a submarine. We defeated the submarine threat in the last war, and it is reasonable to assume that we might be able to do it again if we set out to do it.

(The information requested is classified and has been retained in the subcommittee files.)

Mr. Holifield. Thank you very much, General LeMay, for your appearance here this morning, and your response to the questions. We appreciate it, and it will help us in our deliberations on civil defense.

I might say before we leave the room that Admiral Burke, Chief of Naval Operations, will speak tomorrow morning on mobile missile systems with particular reference to the Navy's Polaris missile submarine.

There has been considerable newspaper comment on the relative advantages of missile-launching submarines and fixed hardened ICBM sites. The committee wants to develop the record on this point to determine the civil defense implications, and to insure that full attention is being devoted to our civil defense problem in this respect.

The subcommittee is adjourned.

(Whereupon, at 11:45 a.m., the subcommittee adjourned.)

(The following information, requested by Chairman Holifield, on the air-launched ballistic missile project known as Sky Bolt, was submitted for the record by General LeMay:)

The Skybolt is a long-range, two-stage, ballistic air-to-surface missile designed to be launched against strategic targets from aircraft traveling at both subsonic and supersonic speeds. The B–52, which will comprise the bulk of the manned strategic force for the next few years, will carry a number of these weapons externally in addition to its normal internal combat load. Equipping the B–52 with the Skybolt will provide a significant increase in the firepower and operational flexibility of the strategic force. The Skybolt can be launched from outside of the enemy defense perimeter from an infinite number of positions which an enemy cannot predetermine or reasonably predict, thus providing the United States with the first realistic capability for omnidirectional ballistic missile attack. Mounted on the long-range B–52 force it provides a degree of mobility and speed of reaction that cannot be matched. Because the bulk of the B–52 force is in being, paid for, and established as a proven and operationally reliable force, it will not require an expensive initial investment. The Skybolt will deliver a destructive payload with accuracy equal to or better than other mobile strategic systems. Because of its unique air mobile capability and the resultant imposition of new demands upon an enemy defense system the Skybolt will provide a valuable adjunct to our military force. Additionally, the Skybolt concept represents the forerunner of air mobile systems of unlimited growth potential in speed, range, and areas of operations.

CIVIL DEFENSE

Part III—Relation to Missile Programs

THURSDAY, MARCH 31, 1960

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON MILITARY OPERATIONS,
OF THE COMMITTEE ON GOVERNMENT OPERATIONS,
Washington, D.C.

The subcommittee met at 10 a.m., Hon. Chet Holifield (chairman of the subcommittee) presiding.

Members present: Chet Holifield, Joe M. Kilgore, Mrs. Martha W. Griffiths, and R. Walter Riehlman.

Also present: Herbert Roback, staff administrator; Carey Brewer, special consultant; Douglas Dahlin, staff attorney; and Paul Ridgely, investigator.

Mr. HOLIFIELD. The subcommittee will be in order.

This morning, we are pleased to receive testimony from Adm. Arleigh Burke, Chief of Naval Operations, on the subject of mobile missile systems, with particular reference to the Polaris missile system.

The main purpose of our hearings this week has been to examine our Nation's capability to survive the effects of a possible enemy attack. We have received extensive testimony from the Office of Civil and Defense Mobilization concerning the status of civil defense shelter construction and OCDM activities in the field of postattack recovery planning.

In my opinion, the evidence presented to the subcommittee indicates that our population is almost completely unprepared to cope with the catastrophic impact of a possible enemy attack. Few shelters have been constructed and only modest resources have been stockpiled for the emergency care of survivors in a post-attack situation.

The subcommittee is particularly concerned over the civil defense implications of hardened bases and ICBM sites in the continental United States. A concentrated enemy assault against those bases would subject possibly our entire population and much of our food resources to the deadly effects of radioactive fallout.

Admiral Burke, I'm sure you share our concern in this respect. As one who is directly charged with the responsibility of protecting our country from a possible enemy attack, you have no doubt given much thought to this problem.

The subcommittee appreciates your willingness to appear this morning, and we welcome your testimony on the particular question of mobile missile systems as well as on other matters you may wish to discuss concerning the problem of protecting our people in the event of an enemy attack.

54223—60——12

STATEMENT OF ADM. ARLEIGH BURKE, CHIEF OF NAVAL OPERATIONS; ACCOMPANIED BY REAR ADM. W. F. RABORN; REAR ADM. J. S. McCAIN; AND COMDR. E. C. BARNHARDT III

Admiral BURKE. Mr. Chairman and members of the committee, it is an honor and a privilege to appear before this committee today to present the Navy's concept of mobile missile bases.

Our national military forces structure must be such as to deter the Soviets from initiating general war, and to destroy their capability and will to continue the war effectively should deterrence fail.

Deterrence exists so long as the Soviets conclude that our surviving military capability will be such as to cause unacceptable damage to the U.S.S.R. after an initial attack upon us, or our allies, regardless of its nature. Implicit in the foregoing is that this surviving capability will be used inevitably and inexorably until their capability and will to continue are destroyed.

In making this, a rational enemy would consider the probably surviving U.S. military capability in its entirety. But undoubtedly, he would give greatest weight to an estimate of our surviving retaliatory forces. This follows because he might conclude that if he could escape devastation by our nuclear retaliation, he could continue the war to a favorable conclusion.

We must therefore insure that our nuclear delivery forces have the requisite degree of survivability. How can this be accomplished while at the same time minimizing the possibility of our country being devastated in any exchange? There are several measures that should be considered. Their effectiveness changes with weapon development. Some measures that have been feasible and effective in the past are less effective now, and will be even less effective in the future.

A brief analysis follows of those measures worthy of consideration as contributing to this survivability.

DIVERSITY OF WEAPONS SYSTEM

A diversity of nuclear delivery system, capable of retaliation from many directions, ranges, sources, delivery means, and commands reduces their individual probability of destruction. Geography is our ally here, since the Sino-Soviet territory is one land mass surrounded by free world territory and the oceans. A diversified threat increases the enemy's problem immeasurably. A surprise attack cannot possibly destroy a diversified retaliatory system. The enemy's problem of defense against those remaining becomes unmanageable.

It is not necessary that each of these diverse weapons systems be sufficient in itself to destroy the U.S.S.R., but their combined residual capability must be such as to do so with an ample safety factor. Multiple retaliatory systems will also insure against the effectiveness of possible innovation in tactics, technique, or technology that might be achieved to nullify the retaliatory capabilities of a single system, or of a small number of systems operating from a single medium.

SIZE

Overwhelming size and numbers are major characteristics of our present retaliatory forces. Large numbers of manned bombers, together with an extensive continental aircraft defense and aircraft warning system, have assured the survival of requisite numbers for retaliation. As the numbers of Russian ICBM's increase, the effectiveness of these measures becomes proportionately smaller. Accuracy of ballistic missiles will increase in the future due to normal technological advances. Accurate ICBM's will increase our vulnerability too much to rely upon superiority in numbers alone. If the vulnerability of our weapons can be reduced sufficiently, the numbers required can be developed from the job they are to do, rather than from the numbers the Soviets have. This relative invulnerability will permit lower force levels without diminution of effectiveness in doing the job. We must avoid trying to match missile for missile, a program which I don't think would be very cheap.

EARLY WARNING

Tactical warning time of a surprise missile attack may vary between zero and a few minutes—the length of time during which fixed weapons in a fixed location must be launched if they are to survive. The time for evaluation and the decision to fire is obviously short. In the face of a valid warning a decision to fire delayed too long may result in virtual elimination of our fixed land based retaliatory systems. In the face of an invalid warning, a premature decision to fire results in the launching of our own missiles.

The above factors would indicate that we cannot rely upon early warning alone for survival of certain of our retaliatory forces.

For a missile attack there is at present no active defense system upon which we could depend.

DISPERSAL

Dispersal of our land based systems, of course, would increase the probability of survival. The optimum dispersal, such that only one weapon could be destroyed by one weapon, is feasible for missiles but not for bombers. Here, again, we engage in a numbers race. Dispersal alone of land-based systems is not the answer.

HARDENING

Hardening is not practical as a means of protecting airbases and bombers. Against missiles of low accuracy and low yields, hardening of our missile sites is feasible and reasonably effective. It forces the enemy to program more missiles per target. However, with the improvements in accuracy that appear imminent, and with presently feasible missile yields, the benefits of hardening are degraded and the best alternative is mobile bases for land-based missiles.

If the analysis of the above measures is correct, then the number of missiles, early warning, active defense, dispersal and hardening will each contribute to decreasing to some extent the vulnerability of our bases, but the extent to which these factors increase surviv-

ability will become less and less as accuracy of ballistic missiles increase. There remain two other means, concealment and mobility.

CONCEALMENT

If our launching sites could be concealed, they would be secure. It is obvious that bomber bases cannot be concealed. Unless we drastically change our security system so that we can block off huge land areas from public surveillance, it is not possible to conceal the precise location of our missile sites. Similarly, our dock areas, naval bases, cities, and other facilities in known locations cannot be concealed.

MOBILITY

Mobility, then, becomes our remaining means of achieving the requisite degree of survivability, as well as providing us time for making the decision to retaliate. With the accuracy our scientists tell us is imminent, the ballistic missile has a high probability of hitting its geographical point of aim and destroying any target which is there. What, then, is the solution? Obviously, it is to build into our retaliatory weapons the ability to move in any direction so that they will not be at a predictable point of aim when the enemy's weapon lands. This can be achieved by giving our weapons the capability of moving continuously, in any direction, at varying speeds. Give them unfettered mobility and you make them unsuitable targets for ballistic missiles. This insured survivability permits inevitable and deliberate retaliatory attack. The time for attack with a part or the whole of our weapon system can then be made at our choosing.

Movement of land-based ICBM's will be feasible some day. Its achievement should be pursued. However, this will not lessen the problem of the spread of fallout from missiles fired by the enemy to destroy the transportation avenues or terminals, including cities, ports, bases, and fixed installations used by any of the Armed Forces.

Mobility is inherent in naval nuclear strike systems. They are available and on station today. Our aircraft carriers provide the Nation with mobile airbases. Upward of 200 naval attack aircraft are deployed overseas continually on these bases which, when at sea, are not suitable targets for IRBM's or ICBM's.

It is now possible for us to fire ballistic missiles with accuracy from the oceans. From the surface they have a high degree of dispersal and mobility and some degree of concealment.

When the delivery vehicle operates beneath the surface, as in a submarine, it combines four of the most effective ingredients, that is, dispersal, hardness, concealment, and mobility. These combined characteristics will make the Polaris submarine system the most nearly invulnerable of all nuclear delivery systems.

It is not advocated that all of our nuclear retaliatory systems be at sea, but the relative survivability of sea based systems is so high that a substantial portion should be. They could well be the determining deterrent factor that we seek. They will survive the initial exchange.

Further, their operational existence in sufficient numbers attacks the problem of civil defense and fallout from two fronts. First, the

inevitability of their retaliatory blows should decrease significantly the probability of a nuclear exchange ever occurring. Secondly, in the unlikely event it did occur, Soviet efforts to destroy the forces at sea would not, of course, endanger our population, and such a Soviet effort would lessen the strength of their blow against forces based in the United States and on our foreign bases for all armed services.

FALLOUT SHELTERS

Turning specifically to fallout shelters, the immediate effectiveness of any shelter system is basically dependent on warning time; the time between when it becomes known that the enemy is attacking and the arrival of the attack. Even with early warning satellites, it is improbable that we would have more than 20 to 30 minutes warning that enemy ICBM's were on the way.

Whether or not to build shelters must be decided then on the basis of our evaluation of several factors. Among the most important are:

1. Probable warning time and state of effectiveness of the air defense system which I have covered.

2. Costs (both initial outlay, amortization, and maintenance costs). On a nationwide basis, these will not be low.

3. Probable effectiveness. This is a debatable factor and relates directly to warning time. It is fair to say, however, that studies indicate that through about 1965 construction of fallout shelters would provide considerable protection for our population.

Because of the improbability of having enough warning time for the major portion of our population to attain shelter, I am not in favor of the Federal Government spending large sums of money on a full-blown shelter program. It makes sense to me, however, to encourage homeowners to provide some form of fallout shelter for their families; on a national basis, to use caves, caverns, worked-out mines, and so forth, for stockpiling food, fuel, critical materials, medical supplies, and so forth, with which to assist recovery should an irrational attack occur.

For defense of the United States in a general nuclear war, the United States needs retaliatory forces whose inherent characteristics insure their ability to survive and retaliate effectively no matter what the Soviets might do. The Soviets should know that, should they start a general nuclear war they will inevitably be destroyed and, therefore, there would be nothing whatsoever that they could possibly gain by such adventurism.

The real strength of the United States lies in the willingness of our forces no matter how good they are—even the Polaris weapons system which we believe will be the best retaliatory force in existence.

The real strength of the United States lies in the willingness of our people to compete, our stamina, our ability to do things better than any other people, the principles by which we live, and our willingness to support these principles.

Thank you, Mr. Chairman.

Mr. HOLIFIELD. Mrs. Griffiths?

Mrs. GRIFFITHS. I have no questions.

Mr. HOLIFIELD. Mr. Kilgore?

Mr. KILGORE. First, I want to thank you very much, Admiral Burke, for coming up. I think this would be a good time to express congratulations to the Navy on its Polaris program.

I have some provincial prejudice in this matter since my fellow Texan, Admiral Raborn, is actively involved in this, but aside from any provincialism I think all of us are pleased with the work the Navy has done.

SUBMARINES AS ICBM TARGETS

There are some variables that affect this matter, but would you be in a position to comment on what extent we might expect the existence of a considerable Polaris submarine force to draw an attack away from the United States?

Admiral BURKE. That, of course, depends upon the Russians and what they might do. They will know as well as we do that ballistic missiles are of no value against ships at sea unless their position is known and the ships stay in that position. Once they fire a ballistic missile, of course, it is on the way and there is nothing you can do to correct its course to allow for target motion.

They probably would not fire ballistic missiles at Polaris subs at all. They will undoubtedly try to develop a nuclear antisumbarine warfare weapon, but they will know there is no way they can knock those submarines out. I think they are convinced of that right now. That is the reason the Russians make so many public statements about the Polaris system.

They know that each Polaris submarine will be able to destroy 12 to 14 targets, and there is virtually nothing they can do to prevent this destruction.

I think the Polaris will act as a real deterrent. There is no way by any surprise attack that they can knock out that weapons system, or even the carriers.

They can't get all the carriers at once by a surprise attack. If they attack the carriers by air, since the carriers are in different locations the attacks will arrive at different times and we will have ample warning to launch a nuclear attack with carrier aircraft. If they don't attack the carriers by air, then as soon as they launch an attack against the United States, or against any of our allies, carrier aircraft will take off and attack with nuclear weapons.

Mr. KILGORE. Conceivably they could attack our carrier force by submarine.

Admiral BURKE. That is true, but they cannot locate all of their submarines in the Pacific and the Atlantic at a given range from all of our carriers and then say "Now, fire, captains." They cannot do that. They will try to attack them one at a time. That will give us plenty of warning. Our own submarines are continually experimenting in exercises with methods of approaching and attacking our carriers and sometimes they have considerable difficulty.

Mr. KILGORE. You wouldn't anticipate, then, that the Russians would expend ballistic missiles in an effort to attack our Polaris submarine force?

Admiral BURKE. No, sir.

Mr. KILGORE. What we would depend on, then, by way of drawing the target away from the United States would be a matter of Russian policy not to attack the deterrent. Once the attack comes there is no

difference in the number of Russian ballistic missiles that would be available to them on the mainland if they saw fit to do so.

Admiral BURKE. You are correct. If you give them a fixed number of missiles all would still be available for attacking other than sea-based deterrents.

ATTACK ON FIXED BASES

There is a possibility, though, that if the U.S. missiles were all in known locations that could be knocked out with ballistic missiles, the Soviets might say "Let us put our missile sites in unknown locations, and let us build enough so that if we fire all of our missiles simultaneously we could knock out all of the enemy's missile bases."

It would be a very difficult trick, but it would be possible.

Mr. KILGORE. It would take a considerable number of missiles?

Admiral BURKE. It would take a considerable number of missiles, depending upon the number of our missiles, degree of hardening, and so forth.

HARDENING AGAINST ACCURATE MISSILES

Mr. KILGORE. In that connection, I notice your statement on page 4 says, as follows, in the part on hardening:

> Against missiles of low accuracy and low yields, hardening of our missile sites is feasible and reasonably effective.

I take it the import of that is that the converse is also your view, that with missiles of high accuracy and high yields, the hardening of our missile sites is not feasible and is reasonably ineffective?

Admiral BURKE. That is correct. However, the most important element there is increased accuracy. The yields of all missiles now are considerable, but the element that is of most importance is accuracy.

Now, our missiles now have a pretty good degree of accuracy, and I'm talking about those of all services, not just the Navy's. Accuracy is much better than we expected a few years ago. It is considered that our accuracy will further improve.

If accuracy gets good enough you can come very close to a target and destroy it with one shot. Even if it is a hardened target if you hit or come close to the hole from which these missiles must emerge, you don't do it any good. You can't harden it enough to withstand a direct hit.

There is a limit, too, to the amount of hardening that you can do. As you increase the hardening it gets more and more expensive. It is impracticable now to go above a certain degree of hardening—we will improve that degree, but it will get very much more expensive.

But the point is this—if the enemy ever gets missiles of sufficient accuracy, he can hit a target and destroy it.

Mr. KILGORE. What sort of a CEP would it take to give them a one-for-one kill probability?

Admiral BURKE. It depends on the hardening. Maybe a CEP of——

Mr. HOLIFIELD. And the size of the missile?

Admiral BURKE. The size of the warhead doesn't make so much difference. It makes a little bit of difference.

Mr. KILGORE. Within a quarter of a mile?

Admiral BURKE. Within a quarter of a mile, a warhead of a half or a megaton would do a lot of damage to a hardened position.

Mr. KILGORE. If we get accuracy within that range it might be anticipated a one-for-one missile attack might effectively destroy a hardened site?

Admiral BURKE. Yes.

PRESENT ACCURACY

Mr. HOLIFIELD. The present error in our tests, is that a matter of security? I think the President did make an announcement on that.

Admiral BURKE. I am not sure. Our accuracy is very good, but I would rather not give the exact figures.

Mr. HOLIFIELD. Our goal originally was a 5-mile circle of probable error, and I know we have gone far beyond that now.

Admiral BURKE. Yes, sir. Our errors are not nearly that big.

PRESENT RELIABILITY

Mr. HOLIFIELD. And our reliability has also gone up from our original goal of 50 percent to 80 percent reliability, has it not?

Admiral BURKE. Yes, sir; our reliability is going up all the time. It is probably not fair to give a reliability figure yet for any missile because we haven't fired enough missiles, but it is improving all of the time in all missiles. Our reliability in Polaris is very good and the reliability of Atlas has been very good recently.

Mr. HOLIFIELD. I think the Von Neumann Committee set as a goal 50-percent reliability, and a 5-mile circle of probable error for accuracy.

Admiral BURKE. Yes, sir.

Mr. HOLIFIELD. And we have gone far beyond both of those in the numbers we have fired so far, as we could average it up and determine it.

Admiral BURKE. Yes, sir.

EFFECT ON POLARIS OF CESSATION OF WEAPON TESTING

Mr. KILGORE. In connection with the discussion of the cessation of nuclear testing, I asked the question yesterday of General LeMay whether or not there is any particular correlation between further testing on the part of this country and the significant improvement of the warhead for the Minuteman. I think a similar question would be indicated for the warhead of the Polaris.

Is there any particular need on the Navy's part for continued testing in order to materially improve the warhead for the Polaris?

Admiral BURKE. The warhead for the Minuteman and Polaris are very similar. We would like to see improvements. We would like to see a greater yield. We would like to have less weight to improve the range. We could make significant improvements, we think, with testing. However, even with the warhead that we now have, it is a very effective missile.

I don't want to get in the position of stating that we don't want improvements. We do. We would like to get less weight and bigger yield.

Mr. KILGORE. I think it is of value to the American people to realize that while there is considerable public interest, and properly so, in stopping testing, there is also a substantial public interest in the benefits that may be gained from testing.

Admiral BURKE. We will, of course, make some improvements, based on our past tests, but there will come a time when additional tests will give us significant improvement.

Mr. KILGORE. The extrapolation of data from prior testing, and the application of it to additional improvements without further testing.

Admiral BURKE. Yes, sir.

PROGRESS IN ANTISUBMARINE WARFARE

Mr. KILGORE. From a civil defense standpoint there is, of course, as you know better than anyone else—the Navy knows better than anyone else—a very substantial interest in the threat, in whatever degree it may exist, of Soviet-launched missiles from submarines. We have a considerable coastline, and a considerable population near the coastline.

Are you making progress in the area of antisubmarine warfare?

Admiral BURKE. We have made tremendous progress in the last 2 or 3 years. Our greatest problem is detecting a submarine in the first place. By the nature of the sea, you can only use sound. We haven't been able to find any other method by which you can detect submarines under water reliably, and sound is limited, but we have made tremendous advances in both our fixed sonars and our sonars in ships. We have 10 to 15 times the ranges that we had in World War II.

We are also increasing the ranges of our weapons so we can fire antisubmarine weapons at long ranges now, and destroy submarines so that you don't have to take the time to make a close-in search and attack. Antisubmarine warfare is a war of attrition. There is no way that we can see of being able to destroy all submarines quickly, ours or the enemy's. The enemy is faced with the same problem. Submarine warfare requires that you fight those enemy submarines all over the world all the time. We will mine their ports, we will have submarines off of their ports to try to get them as they come out. We will have hunter-killer groups searching for them, and we will find some that way and kill them. We will have barriers through which they must go; we will get some of them there. We will have patrol aircraft searching. For normal ship transit we will have antisubmarine screens, both for our men of war and also for convoys.

All of these will account for a good many submarines, but we won't get them all at once, and we won't get them all. Some of them will get through. We will kill a lot of submarines in the process, but some of them can get through. There is no scheme that is foolproof to defend against all submarines and say absolutely "This I guarantee." We will never be able to do that any more than we can guarantee against a bomber attack and say "We will get all bombers by this method." It can't be done.

Mr. KILGORE. You would anticipate—in terms of the present state of the art—that there would be a breakthrough from enemy submarines and missile launchings somewhat in the same order as a breakthrough from a massive air attack?

Admiral BURKE. Yes, sir. We will get a lot of them but if they drive their attacks home, some of them will get through.

Mr. KILGORE. If we assumed a combined attack on the United States from an enemy with the capability of Russia, an attack which would combine ballistic missiles and submarine-launched missiles, and so forth, the matter of warning time would be further shortened over what was mentioned in your testimony, and then those facilities reasonably close to the shore might be the target of a missile launched from 25, 50, 100, or 200 miles away; is that correct?

DIFFICULTY OF COORDINATED ATTACK FROM SUBMARINES

Admiral BURKE. Yes, sir; and the warning time might be very short, indeed, for some missiles. But it will be very difficult for them to coordinate, to have the submarines all in place, and fire at the same time that their land-based missiles are fired.

We are very fortunate in two or three respects. One of them is geography. The geography is in our favor. Our allies are dispersed. They are all over the world. The Russians have tremendous numbers of targets.

CONTROL OF THE SEAS

Another one is that we control the seas. We have ships all over the seas. The Russians do not.

Mr. HOLIFIELD. Is this true, Admiral, in view of the fact that they have 450 to 500 submarines; is it true to say, in view of their submarine capacity, that we do control the seas?

Admiral BURKE. If you mean by that could we prevent every submarine from doing its job—we can't. But what we can do is protect our surface ships all over the sea with large numbers of antisubmarine warfare ships. We think we are more skilled in this than they are at attacking with submarines.

Mr. HOLIFIELD. I remember the havoc, though, that was worked on our surface shipping by some 58 submarines which Hitler had at the beginning of World War II. Of course, they built submarines right along through the war, but they started out with a fleet of 58, and according to Jane's Fighting Ships, the Soviets have around 450 to 500 submarines and most of those have been built under the direction at least of German craftsmen who help to build the snorkel type submarine.

With this great capacity that they have, I am wondering if this isn't ones of the greatest threats to our own country, and to other countries, assuming they do have not only the power to wage war against shipping, but also the power to launch from surface apparatus missiles of the two to five hundred mile range?

Admiral BURKE. Yes, sir; you are right. It is going to be a terrific problem. We will lose a lot of ships, and we will not be able to get all the submarines.

WAR OF ATTRITION AT SEA

Mr. HOLIFIELD. We are pretty well deployed throughout the seven seas. At the beginning of a missile attack upon the surface of the United States, it wouldn't be a matter of them operating exactly at the same time, it would become a war of attrition.

Admiral BURKE. It would become a war of attrition, but the point I was trying to make, that our navies, ourselves, and our allies, roam the seas and we have a lot of antisubmarine warfare ships all over the high seas. The Russians do not. So their submarines will have a tougher time getting into position to fire than our own submarines.

Mr. RIEHLMAN. That is without our country knowing it, and without the Navy knowing it, and knowing something about where their submarines are. Am I correct in that assumption? Our Navy would know the whereabouts of the enemy's submarines because we are keeping close track of them, and they would not be able to deploy them in strategic positions without our knowing something about it, and being aware of it?

Admiral BURKE. In large numbers; that is correct. We don't have the forces to be able to track or to know where one submarine comes through a barrier.

Mr. RIEHLMAN. But in any substantial number——

Admiral BURKE. Yes, sir; we should be able to do that.

Mr. HOLIFIELD. Would you say at this time that the Soviet submarine forces are penned up or are moving freely in the oceans?

Admiral BURKE. They are operating quite a lot. They are increasing their operations year by year. Their operations this last year——

Mr. HOLIFIELD. Of course they have as much right in the international waters as we have.

Admiral BURKE. That is true, and they should.

Mr. HOLIFIELD. Isn't it true they have done a terrific job of oceanography and charting of the topography at the bottom of the ocean?

Admiral BURKE. Yes, sir.

Mr. HOLIFIELD. And this is very important for many reasons?

Admiral BURKE. Yes, sir; they have an extremely active oceanography program. Density, salinity, all the aspects of oceanography. They are pretty good at it.

Mr. HOLIFIELD. The hills and the valleys and the protected sonar areas, and all that sort of thing?

Admiral BURKE. Yes, sir; the antisubmarine warfare we have facing us is not an easy problem and, as you pointed out, it is going to be a warfare of attrition. But it would be quite difficult for the Soviets to deploy large numbers of submarines to any position in the world far away from their own coast without our knowing about it.

Mr. HOLIFIELD. They would have the problem of tending, too. This is one of the things about the atomic submarine, you don't have to be provisioned and serviced as often.

Admiral BURKE. Yes, sir.

Mr. HOLIFIELD. I would suggest that Admiral Raborn proceed with his presentation, and then we will proceed with our questioning.

STATEMENT OF REAR ADM. W. F. RABORN, DIRECTOR, SPECIAL PROJECTS OFFICE, BUREAU OF WEAPONS

Admiral RABORN. Mr. Chairman, in unclassified language, I would like to bring you up date, this committee up to date, on the technical status of the Polaris program across the board.

You recognize, I am sure, that many of our terms will be general in nature because of the unclassified atmosphere.

If I may, I would like to start with the missile. While this is just a part of the program, I am sure that in the eyes of most folks this is probably most interesting. Perhaps if we start with the flights. The missile integrity, the basic missile integrity has been assured by both land and sea based flights from launch tubes, and we have had successful full scale tactical prototype flights of well over 900 miles. These missiles are instrumented and because of the instrumentation are heavily weighted down and considerable improvement in range can be had by weaponizing the missile.

We have had 9 out of 11 successful firings in calendar year 1960.

GUIDANCE

In the field of guidance, as Admiral Burke indicated, we have been most pleasantly surprised. This guidance package, which is the brainchild of Dr. Stark Draper, of MIT, has proved itself in a series of rugged tests, a series of tests both on the high speed station at Inyokern and also from full scale guided flights from Cape Canaveral of the missile.

We had one unprogramed vertical loop when a segment of a jetevator came off, and the missile did a complete outside loop and still the guidance package which was driving the missile told us about it with great accuracy and gave us such confidence that we speeded up the first fully guided flight by a month.

Mr. HOLIFIELD. Could I interrupt you and ask you this question: It is necessary for you to know where you are in order to know where the missile will be at the end of its trajectory. Now, have you solved that problem accurately enough to know exactly where you stand in relation to the earth's surface, even though you are under water several hundred feet?

Admiral RABORN. The answer to your question, sir, is "Yes," and I plan to tell you a little more about it in my next Vu-Graph.

In brief, the missile guidance package is in production and production models have most adequately demonstrated their ability to guide the missile to the target. It has also demonstrated that it has complete satisfactory response from the directions given to it by the fire control system. The fire control system, as you know, takes the location of the submarine from the navigational system, and the location of the target, and grinds out usable information for input into the guidance package, so that the missile will know where to go to hit the target.

In the field of solid propellants, the Navy has had to do a great deal of pioneering in large solid propellent motors. The design concepts have been proven in tactical missile flight tests. As you know, we have had considerable trouble learning how to build a lightweight case, strong enough, yet light enough so that it will not prove unnecessarily burdensome to hurl through the air. We have had trouble with the controls of the missile.

We turned to an invention of Dr. William Fiedler, who was the World War II German project officer on the V–1. He invented what is called a jetevator, and we have refined and engineered the jetevator, so that it is suitable with the very hot propellent gases which it has to dip into in order to guide the missile.

We not only have the problem of guiding the missile by means of these outboard rudders, if you please, and the thrust termination which has to be done with great precision in order to keep from overshooting or undershooting, but both of these technical items have been pioneered most successfully for this bird by the Navy.

In summary, we have had from September 1959, through March 31, 1960, we have conducted 12 out of 17 fully successful flights, a truly very high average for this stage of development. And 5 of these 17 were partially successful in which one or more of our primary objectives was met, and 9 of the flights this year out of 11 have been fully successful in every respect.

I will turn now to the status of the submarine, if I may.

POLARIS SUBMARINES

As you know, we have four submarines in the water. Four have been launched. The *George Washington*, the first of these submarines, is in commission, and it has aboard it a complete weapons system, and we have been busy in the last few weeks and months integrating and grooming equipment for tests at sea. I am most happy to say that we have had no major difficulties in marrying up the several sets of equipment aboard the ship. We have had slight mechanical difficulties which you would expect and they have been easily overcome.

In the *Patrick Henry*, which will be commissioned the 9th of April, the same kind of success in installing, checking out, and making compatible the various elements of the weapons system has been accomplished.

SHIPBOARD LAUNCHING

We have just recently fired a missile from the *Observation Island*, which is a missile firing ship. This ship has aboard it a complete submarine weapons system. This is a Mariner type vessel which we obtained from the Maritime Commission at no cost and converted it into a missile firing test ship. The day before yesterday we fired our first fully integrated shot from the *Observation Island*. This was a test which consisted of the navigational system determining location of the ship, giving that information to the fire control system, and from the location of the intended target, which was also given to the fire control system, usable information was ground out by the fire control system, introduced into the missile guidance system, and the shipboard launcher (which is a duplicate of what we have in the USS *George Washington*) successfully ejecting the missile. The missile flew beautifully, and right on course, until a few seconds before the end of the second stage powered flight when the thrust termination occurred early, from an anomaly inside the missile and the bird landed considerably short of the intended target, but in the neighborhood of 700 miles downrange.

From the development point of view, this was a highly successful test. From my point of view, having the responsibility for the development of this program, this was a most successful test. The anomaly in the missile does not in any way vitiate the fact that the principal objective of the flight was the complete integration of the submarine weapons system which we had aboard the *Observation*

Island. We will do more of these in the future, and we hope they will continue to prove out quite well.

Mr. HOLIFIELD. Now, you are talking about a missile launched from shipboard, not from underneath the water?

Admiral RABORN. Yes, sir; from shipboard. One of the requirements we have on the submarine is to be able to launch it above water as well as below water.

NAVIGATION SYSTEM

Mr. HOLIFIELD. Was your positioning done on the basis of knowledge that can be obtained from a surface ship, or was it determined by the problem you would have if you were under water?

Admiral RABORN. Let me answer this way: The *Observation Island* has the identical equipment which the submarine has. That includes the navigational system and the position of that ship was determined by the submarine navigational system, so that this was a very good test of the submarine system in its entirety.

Referring to the navigational program we put into operation another navigational vessel 3 years ago. Aboard this vessel for the past 3 years at sea, in the sea environment, we have been conducting sea-based tests of the various equipments that make up the navigational system. We have brought this along to such an extent that aboard this ship, a surface vessel, and aboard a submarine which Admiral Burke has loaned us, we have tested out the *George Washington*'s navigational equipment, so that we can navigate the submarine by actual tests to accuracies better than twice we anticipated we would need in order to accurately fire a ballistic missile at sea.

So this is a very precise answer, Mr. Chairman, to your question.

FIRE CONTROL

Now, in the area of fire control which I have mentioned once or twice. This is a beautiful piece of equipment. It is a very flexible and a very versatile piece of equipment. Where we have a moving ship underneath the water, with a multiplicity of targets, the fact that the fire control system is able to tell to the missile guidance system, in usable language, the kind of information necessary for it to know where to go when it is launched from underneath the water and heads off toward the target, is quite an accomplishment.

We have many of these systems in operation, and one in particular has been telling the missile where to go at Cape Canaveral and from *Observation Island* on all of its guided shots.

TEST LAUNCHINGS

We have an underwater launcher. This is a full scale underwater launcher. It is the same as the launcher which the *George Washington* has aboard. This launcher is in a caisson. This launcher with the missile loaded in it can be sunk to the bottom of the water. From underneath the surface, and with well-controlled and instrumented conditions, we have had over 60 missile launches this past year which have completely proven out the practicability of underwater launch. We have precise technical knowledge of what goes on and what is necessary, and it has been highly successful.

Last Sunday we had reason to once again acknowledge that in developmental business you occasionally fall on your face. We were going to launch a flight-type missile from this submerged launcher off the coast of San Clemente. We were going to have a little layer of propellant in the first stage motor, in order to give visible proof to many folks who didn't understand how we can launch a missile from underneath the water and still ignite the propellant. Of course we have ignited many missiles underneath the water. This missile was to be ignited after coming out from under water into the air.

We proceeded with great confidence. I think if we had less confidence we would have done better. The missile power was shifted to internal power when we were ready to launch, and through a series of relays, and so forth, the missile power was inadvertently turned off 1.7 seconds before the man hit the launch button which gave the high pressure air a chance to launch the missile out.

So the missile was launched, we are sorry to say, in an inert condition. A dead condition. And the ignition device had no opportunity to ignite the propellant.

We have a series of these planned, and we hope the next one will not have this mishap. In fact, we are sure that we won't.

In summary of the launching, the launcher in the element of the water and under rough water conditions created by cruisers steaming by to give us waves, currents, and so forth, has been most acceptably proven out. Aboard the *George Washington* last week at sea we launched a series of dummy missiles, most successfully. So not only have we proven them out in the development field, but in the tactical version aboard the ship, handled by sailors, our own enlisted men, who have done quite well.

If I may, then, résumé the status of the entire program:

THE MISSILE

We have great confidence we are going to meet our goal of having a 1,200-mile version available for deployment this fall in the *George Washington.*

THE SHIPS

The submarines have come along quite well, indeed. These are complicated nuclear-powered submarines. The way the equipment has fallen into place is a great tribute to the very dedicated missile team and shipbuilding team which is employed in this program. The country can be very proud of them, in my opinion.

COMMUNICATIONS

This is also a function of my Office. We have had equally good success. Many new and improved methods of communicating with submerged submarines the world over have been brought forward. The very low frequency station and very high powered one at Cutler, Maine, has been brought forward in its completion. So this very powerful new addition to our world network of very low frequency radio stations will be added.

Mr. HOLIFIELD. Admiral, one of the criticisms of the submarine has been this lack of communications with each other and also with the

home base. From what you say, you feel that you are getting nearer to the solution of that problem?

Admiral RABORN. Yes, sir; we have the solution, and it is not possible for me to describe it to you in any great detail in an unclassified briefing.

Mr. HOLIFIELD. It is unnecessary for you to describe it. I was just hoping that you could give us the assurance that these technical difficulties that you have had in years gone by are now being overcome.

Admiral RABORN. I can give you that assurance, and I can also say, sir, which I know you know, for the record, the Navy learned how to talk to submerged submarines in World War II. We have had remarkable improvements in that capability since then, and now we have the capability of talking to submerged submarines wherever they are, and whenever we want to.

And this I am sure should be most reassuring to folks who don't know this, and who have had, I am sure, just cause to be concerned.

PRODUCTION BASE FOR POLARIS SYSTEM

The production, operational, and industrial backup to this program has been brought along in step with the requirements of the program. We have a fine nucleus upon which to build, should additional submarines be desired.

Mr. HOLIFIELD. Couldn't we develop this just a little bit. I am not asking you to set up a program at this time, but I am asking you this: If the Congress should see fit to support this nuclear submarine capability with additional funds, could you increase the production of both attack type nuclear submarines and the Polaris type?

In other words, do we have the shipbuilding equipment, do we have the skilled men, and so forth, whereby an increased annual number of submarines could be produced if the Congress did back you with additional funds.

Admiral BURKE. Yes, sir. We would, of course, have to increase our training facilities, but we could build as many as 12 Polaris submarines a year, within 2 years. I mean we could come up to that rate within 2 years.

GOAL FOR POLARIS SUBMARINES

Mr. HOLIFIELD. There are a number of us in the Joint Committee on Atomic Energy who have been very much interested in Congressman Van Zandt's bill. We realize he may be shooting a little bit high, as far as funding is concerned; but, as you know, he does have a bill in for a goal of a hundred nuclear submarines. I think the Navy's program at the present time is a little less than 40, isn't it?

Admiral BURKE. We have three Polaris submarines and three attack submarines in the fiscal year 1961 shipbuilding bill, all nuclear powered. A total of six. The total number of Polaris submarines we would like to have is some place in the neighborhood of 45. The total number of attack submarines, and this is a long way in the future, is about the same number of that type that we have now, about 100. Perhaps a few less.

DETECTION OF NUCLEAR SUBMARINES

Mr. HOLIFIELD. Could you comment on the difference in detectability of a conventional submarine and a nuclear submarine, insofar as your sonar devices and other means of detection in the water are concerned?

Admiral BURKE. Yes, sir. The conventional submarine must surface periodically or come up to snorkel depth, and thereby expose part of the submarine in the atmosphere. We have very fine radars in aircraft with which we search the surface of the ocean to detext them. Conventional submarines are vulnerable because they can be picked up at long range. Now that is the weakness of conventional submarines. Nuclear submarines do not have this weakness.

Mr. HOLIFIELD. How about the sonar device, will the sonar devices work as efficiently against nuclear submarines as they will against the reciprocating engine type? The vibration of the engine doesn't have anything to do with it?

Admiral BURKE. With active sonar the ship puts out a source of energy, bounces it off the submarine, and gets an echo back. The engine type doesn't make any difference. But where a passive type of sonar is involved, you just listen and pick up noises of a ship. In this case a conventional submarine that is surfaced and running on diesels can be heard farther because it makes more noise.

POLARIS USE ON SURFACE SHIPS

Mr. ROBACK. Do you have an active program for a ballistic missile from surface ships?

Admiral BURKE. We have submitted a recommendation to that effect. It is no trick. We have missiles in the observation island.

Mr. HOLIFIELD. This would be along the line of the Regulus?

Admiral BURKE. No, it would be just a regular Polaris.

Mr. ROBACK. A surface Polaris?

Admiral BURKE. Yes, sir.

Mr. ROBACK. Is this an interim capability or is this a different kind of capability?

Admiral BURKE. It is the same capability as in the submarine. You could get it fairly soon and it would give you an additional capability.

Mr. ROBACK. Is it a capability you get more cheaply than the submarine Polaris?

Admiral BURKE. You get it some cheaper, but these things are all expensive.

Mr. HOLIFIELD. You sacrifice a part of your concealment by having it in a surface ship?

Admiral BURKE. That is true, but the enemy will have to worry about surface ships then, too, and they can't sink those surface ships by ballistic missiles, either. They have to search and attack. Those surface ships will be steaming on their normal course of business. If you have just a few missiles on surface ships, the Russians will never know where those ships are, which ones have missiles and which ones don't.

When we first employ Polaris submarines we will mix them up with regular submarines. The enemy will never know which submarine is which. Surface ships will present the same problem to the enemy.

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COST OF POLARIS MISSILE SYSTEM

Mr. ROBACK. When the Air Force complains about the cost of the Polaris system, as it did in testimony yesterday, they are talking about the cost of the submarine largely?

Admiral BURKE. No, they are talking about the total program cost. But if you compare total program cost of all of these weapon systems, they are all great. In a comparison with other systems with their holes in the ground, research and development, tests, the whole works, the Polaris missile system will come off very well, will prove very cheap.

Now, if you apply the factor of survivability there, then I am sure the Polaris submarines will be much cheaper than any other ballistic missile system. But the comparison of costs should be on total program costs. This whole Polaris program costs a great deal, but you get so much out of it. That is true of any successful program these days.

The Polaris systems are not cheap, but nevertheless are not any more expensive than other systems.

Mr. HOLIFIELD. Polaris will run around $100 million?

Admiral BURKE. It is a hundred to a hundred and ten per submarine and we hope to get the cost down.

Mr. HOLIFIELD. How does that compare with the conventional submarine?

Admiral BURKE. They cost about $50 million with nuclear power.

Mr. HOLIFIELD. Considering its capability it is relatively much cheaper, then?

Admiral BURKE. Yes, sir.

Mr. HOLIFIELD. It is more in dollars but in terms of capability it is much greater. They carry 16 of these missiles and the total firepower I have been told of one Polaris submarine is greater than all of the bombs that were exploded in World War II.

Admiral BURKE. Yes, sir; that is true. It has terrific firepower, and the important part of the Polaris submarine is its inevitableness. You can put it out and forget it. You don't have to be in a hurry, you don't have to get excited, you don't have to say "I have to do something in 5 seconds or 10 minutes, or today." You can wait. If you wait too long, and enemy missiles start hitting targets in this country it doesn't affect that submarine one bit. It can fire any time you want it to fire. It can fire quickly.

Mr. HOLIFIELD. You have sure retaliatory power there.

Admiral BURKE. Yes, sir. The inevitableness of punishment is deterence.

Mr. RIEHLMAN. Mr. Chairman, could I ask this question?

Admiral, has there been any study made of the cost to deploy the Polaris missile on our surface ships or on our carriers? Can it be fired from a carrier?

Admiral BURKE. Yes, sir.

Mr. RIEHLMAN. Is that an expensive operation?

Admiral BURKE. I would like to check the figures for the record, but I think it is about $50 billion for Polaris missiles in a guided missile cruiser.

Mr. HOLIFIELD. That is the cost of installing them?

Admiral BURKE. Yes, sir.

Mr. RIEHLMAN. How would that compare to installing them on the submarines?

Admiral BURKE. It is about the same. Just about. An ordinary submarine costs $50 million, and the Polaris submarine costs a hundred million dollars.

Mr. RIEHLMAN. And they have been tested, of course, and could be fired from a surface ship?

Admiral BURKE. Yes, sir; the one we fired the other day was——

Mr. RIEHLMAN. Just as accurately and maybe more so than from a submarine?

Admiral BURKE. We thought at one time we could fire them more accurately from surface ships than from submarines, but our accuracy in navigating submarines has improved so much in the last couple years that now it doesn't make any difference. They are both extremely accurate.

PRODUCTION CAPACITY FOR POLARIS MISSILE

Mr. RIEHLMAN. If you decided to deploy them on some of our surface ships, would you have any trouble in producing the missiles in sufficient quantity?

Admiral BURKE. No, sir. We have plenty of missile capacity. It won't be an easy problem. However, it is something that we have studied. We know we can make the additional missiles, we can use different shipyards for the modification of the ships. It won't interfere with our submarine building program at all.

Mr. RIEHLMAN. Do I understand there is a program under study at the present time to deploy some of the Polaris missiles on our surface ships?

Admiral BURKE. Yes, sir. We have submitted a request.

COSTS OF POLARIS AND MINUTEMAN

Mr. HOLIFIELD. What is the comparison between hardened bases for existing missiles of the same type—let us say the Minuteman missile, which will be very comparable to the Polaris, and the installation in either a ship or in a submarine?

Admiral BURKE. I haven't any very accurate data on the cost of Minuteman, and I don't know what the data is.

Mr. HOLIFIELD. I am talking about the hardening to 100 p.s.i.

Admiral BURKE. Yes, sir. I don't even know the figures of the cost of the Minuteman or for its hardening, sir, but it should be cheaper to install Polaris in the ships because you can put missiles in a group and utilize one fire control system.

If you have an individual missile with its own fire control system, it costs more than having them in groups.

Mr. HOLIFIELD. I believe the plan is to have them in groups of three, one control system for three missiles.

Our testimony yesterday said at the present time we estimate $1.2 million per missile, in the hole.

Mr. ROBACK. That is the hardened system.

Admiral BURKE. That must be after they have gone into quite a bit of production because our Polaris——

Mr. HOLIFIELD. This isn't the cost of the missile, it is the hardening of the silo, you might say.

Admiral BURKE. Well, that is a remarkable cost, sir. Our cost is about $1.2 million now. If we were to make those in large quantities, and get a high rate of production, the cost would come down considerably. That figure must be based upon high rate of production after they have been in production over their learning curves. I don't know the basis upon which their figures were computed.

Mr. KILGORE. If we use the $1.2 million as the total cost of the deployment of a hardened Minuteman missile, then your statement about the Polaris missile being far cheaper wouldn't hold.

Admiral BURKE. It wouldn't hold, not with figures like that, but I don't know how those figures were derived.

Mr. KILGORE. You have some doubt about the figures?

Admiral BURKE. I don't have doubt about the figures, but what I have doubt about is, if that is the figure for the 1,000th missile it is different than if you are talking about the 50th missile.

Admiral RABORN. I might add that the Minuteman is a missile similar to the Polaris. It has one additional stage. It is a solid propellent missile. It is built on the same technology upon which we have built, and in which we have contracts and are in production on. I think it is reasonable to believe that it would be difficult to build a missile three times as big to go three times as far for any less money than we are spending for Polaris.

Mr. HOLIFIELD. How much of the Minuteman technology was paid for by your research and development in Polaris, or is it the other way?

Admiral RABORN. We are about 3 years ahead of the Minuteman. They are about where we were when we started, you see, in Polaris. They expect to be operational in 2 to 3 years. That, of course, is the length of time which we have been in development of the Polaris.

There has been an excellent interchange of information between the three services on solid propellent matters and also on technology of metal parts. Having started some 4 years ago, it is reasonable to believe that we had to do a considerable amount of pioneering, and, we, of course, made that available to the common funds of knowledge, and I expect in the future we will be getting some things back from them as they get into their work a little more.

Admiral BURKE. Could I add there, sir, that we owe a great deal to the other services for various parts of the technology, not only in missiles but in everything else, and the exchange is very good.

Mr. HOLIFIELD. In this committee's previous investigation of missile procurement and related matters, we did establish this very fact that your interchange had been better from the Navy standpoint than it had been between other branches of the service. We found that while there had been no concerted effort to refuse an interchange, there had been a lack of use of information which was available and could have been had, had it been asked for by the other two branches.

Admiral BURKE. One of the things we used to find difficult, even in the Navy, sir, is the use of something that was invented some place else. We now use it no matter who invents it. If it is good, we use it.

Mr. HOLIFIELD. I think it should be that way with every branch of the service.

TRACKING OF POLARIS SUBMARINES

To what extent can the enemy detect and track Polaris submarines? In other words, how great is the hazard of our losing these $100 million submarines?

Admiral BURKE. As far as detection is concerned, it is just another submarine, and it will be just as easy and just as difficult to detect, track, and destroy a Polaris submarine as any other nuclear-powered submarine.

Now, we aren't going to give the enemy a free shot at this. We are not going to deploy a Polaris submarine in one spot and leave it there. We are not going to deploy just a Polaris submarine. We are going to give him lots of targets to work on.

Mr. HOLIFIELD. You will have conventional submarines?

Admiral BURKE. We will have all sorts of things to worry him a little bit. If he wants targets, we are going to give him targets.

Mr. RIEHLMAN. If he finds the right one he will be lucky.

Mr. KILGORE. It sounds like you will need a traffic controller.

Admiral BURKE. He might need one.

It is impossible for one submarine to follow another submarine for any length of time and continuously track it by itself. And what we will do with these Polaris submarines is deploy some of our own attack submarines with them, just in case somebody wants to try that. He will suddenly find himself mixing up with an attack submarine. One way of doing it, is just orbiting the attack submarine to see who is around.

Mr. ROBACK. Is that the Navy's answer to the Air Force's contention that these submarines can be tracked? That is to say, tailed by the Soviets, and in effect the striking force would be that much impaired?

Admiral BURKE. That is one way of doing it, but it is very difficult even if no action is taken. You couldn't track 15 to 20 submarines—all of them.

Mr. ROBACK. I used the "tail" here. If I may paraphrase General White, he said, the Russians could take approach: "You put your submarines out, we will put ours on your tail, and wherever you go we will go. You can't prevent us under international law from doing that."

Admiral BURKE. That is right, but it is difficult. Our own submarines have tried this with each other, and they are not so very successful. It is not easily done. But there are lots of tricks. If they want to tail one of our submarines, how can they do it? They will have to tail it by sound. These Polaris submarines will be going very, very quietly. If a Polaris captain thinks he is being tailed, he may stop and not put out any noise. Another accompanying submarine that puts out a little more noise, may be used to decoy the enemy away.

Mechanical decoys from one of the torpedo tubes can be used to give the enemy lots of noise. Surface ships can check to see where friendly submarines are and where enemy submarines are and then see if the Polaris ship is being trailed. Aircraft overhead with sonobuoys can put an enemy through a screen.

This sort of thing happened during World War II with aircraft. Our aircraft would make an attack, and the Japanese aircraft would follow our planes back to our carriers.

To counter this we had our aircraft fly above certain surface ships, and ships personnel would inspect and say "There is a Jap up there with you," and we would shoot him down.

We can do the same thing. Have our submarines go through a screen and check on all the strangers. There are many ways of doing this. We will use them all.

Admiral RABORN. If I may amplify this just a moment: We have made some analysis of this, and each of our submarines will be operating in an ocean area approximately the size of the State of Texas, and as most of us know it is an awfully hard thing to get anything bigger than that.

Mr. HOLIFIELD. Unless you go to Alaska.

Admiral RABORN. If you put a jet bomber up over Texas and tell the jet fighter without any help from ground stations and radar, "You have to go out and find that jet bomber," it will be a sizable job, even though the air is very transparent.

Now, if you put a submarine in the water, submerged in an area the size of the State of Texas, put another submarine there and say "Go find him," because he doesn't have any shore-based directions, or other assistance, it is going to be manifestly, vastly increased over the airplane job.

PIECEMEAL DESTRUCTION OF SHIPS AT SEA

Mr. ROBACK. Mr. Chairman, could we get in this context an evaluation by Admiral Burke of the Air Force's contention that if we removed all of our missile sites, and in effect the basic military target, from the continental United States, we would be exposed to the situation wherein the enemy could by attrition destroy targets piecemeal and yet never in any case put upon us the obligation to retaliate, because then we would be exposed to complete assault in the continental United States?

Admiral BURKE. You mean by that, if I get it correctly, they would sink our submarines one at a time, and we wouldn't do anything about it?

Mr. ROBACK. Suppose they run into a submarine and attack it. The question is, Are you going to start a war which would expose the whole United States on the basis of that kind of operation?

Admiral BURKE. Do you mean we ought to put the target in the United States, so when we get hit in the United States there would be an automatic triggering of the reaction?

Mr. ROBACK. That is what General LeMay has stated before this committee.

Admiral BURKE. There is some justification for that. What you really mean there is, What will cause the United States to go to war? And, of course, we cannot predict exactly what will cause the United States to go to war in the future, maybe 5 or 10 years from now. How much provocation do we have to have? If they attack—if Russia were to attack our Army in Korea, would we go to war? Would we fight? If they attack in Germany—how many people would they have to destroy in an attack before we fought? If they

attacked our ships at sea, if we lose one ship, we are going to do something. We are not going to sit and wait. Nobody in the United States is going to sit and just wait for another attack on more ships.

POSSIBLE LIMITED WAR AT SEA

Now, it is barely possible that we could have a limited war at sea. It is possible that it would never extend to the United States, but the enemy would lose that war. That is why we are working so hard on antisubmarine warfare. Enemy submarines couldn't get all of ours before we get them. It is a warfare of attrition.

That type of war is possible. It is very unlikely, though. It is very unlikely that if they were to attack our ships more than once, that we would take it without taking action. We would do something. We would react. But it is possible that you could have a limited warfare at sea. If so, if that is true, then that is far better than having a general nuclear war. We will win any limited war at sea, and the United States won't be destroyed in the process.

Mr. HOLIFIELD. You mean you would win a limited war providing you had nuclear submarines against conventional submarines. If you had 100 conventional submarines against 450 conventional submarines, the very weight of numbers in an attrition type of war would have to be considered.

Admiral BURKE. It is their submarines against our antisubmarine forces. Our antisubmarine forces include not only submarines, but the rest of the antisubmarine effort. Submarines are important, but are only one part of the team.

Mr. HOLIFIELD. Your position really is that we have a much better antisubmarine capability than they have at this time?

Admiral BURKE. Yes, sir.

Mr. HOLIFIELD. They have more submarines but we have developed an antisubmarine capability that is greater than theirs at this time?

Admiral BURKE. We have a good one. They are working hard on antisubmarine warfare, too. There would be a terrific effort on our part, but still we would have a good chance of winning.

Now, if they want to start that kind of a war, it is possible that it could be a limited war at sea, without ever going into a general war. If so, it is better than going to a general nuclear war in which both countries are bound to be destroyed. And they could not get all of our Polaris submarines in any reasonable time.

I mean, it would take 3, 4, or 5 years even if we had very weak antisubmarine forces, which we do not have.

Of course, as we mix our antisubmarine forces, our own attack submarines, up with Polaris submarines, it would be impossible for any enemy to destroy them all.

Mr. HOLIFIELD. Admiral, as I listen to you I wonder if you are not indicating that the strategy of war has moved seaward in the last decade.

VULNERABILITY OF FIXED BASES

Admiral BURKE. I think it has, sir. I think the importance of things at sea has increased a great deal. The reason for that is primarily ballistic missiles, the ability of a ballistic missile to hit a fixed target a long way away. And as the accuracy increases, all of

those fixed targets are going to become more and more subject to destruction by a missile attack.

Mr. HOLIFIELD. This certainly applies today to all of our fixed bases overseas?

Admiral BURKE. Yes, sir.

Mr. HOLIFIELD. With this range—many of them are within the range of intermediate range missiles at this time?

Admiral BURKE. Yes, sir.

Mr. HOLIFIELD. Really what you are saying is what General Gavin said—I think I have it here somewhere—he made this observation:

> It is an interesting fact of war that mobility is the handmaiden of the nuclear age. Because you have dispersion and reaction.

I thought that was a very pungent statement.

Admiral BURKE. Yes, sir.

COMPARISON OF POLARIS AND MINUTEMAN

Mr. HOLIFIELD. Getting to the mobility of the Minuteman, how would you compare the Minuteman's mobility—that is, on the railroad system of the United States—with the Polaris' mobility, and also how would you rate it with the theory of the hardened bases of the United States?

Admiral BURKE. With regard to the Minuteman movable system versus the hardened base system, I think it is very important to have Minuteman movable so you can move it from one place to another. I think the degree of importance of that is dependent upon the accuracy of the enemy missile. If the enemy gets very accurate missiles then it becomes more and more important to have movable Minutemen. I think those can be produced, and I think they are very important.

Now, hardened bases are very good. They are very important, but their importance decreases with accuracy of the missile. As I have said, if you get them accurate enough, hardening doesn't do any good. But it is good now, it is profitable now. Its value will decrease in the future as accuracy increases.

With regard to the comparison of the movable Minuteman with the Polaris at sea, the Minuteman is unfortunately restricted to tracks of some kind or another, and those tracks are subject to destruction. You don't have any tunnels at sea that you have to worry about. And by that I mean access. Mobility at sea means ability to go in any direction, any course, any speed, any time. With submarines, of course, you are completely concealed. With surface ships also, you can go any course, any speed, any time. On land you are restricted to your tracks and you can move them from here to there, but you cannot go in any direction.

Now, that doesn't mean that rail-mounted missiles are not any good. They are good.

Mr. HOLIFIELD. There is a tremendous network of rails in the United States. If you consult a railroad map you will see that there are all kinds of branch lines and there are many areas where considerably mobility could be obtained without the handicap of tunnels.

Admiral BURKE. Yes, sir.

Mr. HOLIFIELD. And in that instance I think you are probably thinking of the espionage in the tunnels, bridges, and things like that.

Admiral BURKE. Yes, sir; and just the size of getting through tunnels, underpasses, bridges, and so on.

But I think it is true, the movable Minuteman is very important, the most important land-based ballistic missile.

EMPHASIS ON MOVABLE SYSTEMS

Mr. HOLIFIELD. In other words, if you had the responsibility of land-based operations, you would favor putting your eggs in the basket of the mobility rather than in hardened bases?

Admiral BURKE. Yes, sir. I would actually favor both, but I would emphasize movability. I would do both. We do not have movable ones yet, but I think we will get them. I don't think there will be any serious trouble about it. Still, I would favor a little bit of both, but I would put most of my emphasis on mobile ones.

SINGLE STRATEGIC WEAPON COMMAND

Mr. HOLIFIELD. Do you agree that there should be one weapon command for all strategic missiles? Would you favor that type of a system?

Admiral BURKE. No, sir; no, sir. First, there is no need of it. There are three things that are important in a retaliatory attack. The first is the order to fire. When the President gives the order to fire, he says "Launch the attack," and this goes out to all commands, by all means—radio and every other way you can send it. That command must be spread throughout the world quickly.

The second thing that is important is to coordinate your launching vehicles. Now, in aircraft, your aircraft have to be coordinated so that you don't have half a dozen aircraft in the area at the same time, one aircraft getting in the fallout of a bomb drop by a previous aircraft. You have to account for antiaircraft defenses, and assign targets to other aircraft to make up for aircraft shot down. There is a lot of coordination necessary with the vehicles.

Now, coordination is done through the various unified commands, and it is pretty good. It works pretty well.

The naval aircraft, the tactical aircraft, the SAC—these are all pretty well coordinated.

Now, with missiles you don't have to coordinate your vehicle. You press a button and the missile is on the way and there is nothing you can do about it. It is on the way and it is going to get there in a very big hurry.

COORDINATION OF SUBMARINE OPERATIONS

With submarines you have to coordinate your Polaris submarines with your other submarines. Above all you have to coordinate your Polaris submarines with your antisubmarine forces.

I nearly killed one of my best friends, during the war. He was a submariner and I thought his ship was an enemy. I let him have it.

Fortunately, I wasn't as good as we are now, and he lived. But I dropped depth charges on him. I tried to sink him.

We did destroy some of our own submarines because we didn't know they were friendly. We set up, then, a very complicated system of sanctuaries, of movable areas in which the submarine traveled where you couldn't attack any submarine. And 20 miles ahead of this area, or 10 miles on either side—it was very complex. Every sailor at sea had to know whether or not the surfaced submarine that he sighted was enemy or friendly, and you couldn't know them all. But there were certain areas in which you could not attack.

You also have to coordinate a submarine with its tender. Supposing that we had, say, eight Polaris submarines on station, and one of them was going to be relieved by another Polaris submarine. Suppose the submarine going out to relieve develops engine trouble, or has an appendicitis case, or something else, and he sends back to his boss, "Boss, I want to come back to the tender, and I think it is going to take me 4 days to repair this engine." The boss has got to make decisions. He says, "Do I leave that station blank? Do I tell that submarine already there to stay there? Do I send out another Polaris submarine? Do I tell this submarine, 'Look, you are not in as much trouble as you think you are, you go on anyway'?" The boss has to make that decision, and he has to coordinate. When he makes his decision he has to coordinate that one Polaris submarine movement with the tenders, with the antisubmarine warfare ships, with other submarines, with the whole works. The difference is that this is coordination that has to be done all the time in peacetime, normally. There is no change in the coordination necessary in war.

The operation of submarines, including Polaris submarines, should be under a unified commander, through the component commander, as they are now, and as they have been, and are in all nations.

Mr. HOLIFIELD. Mr. Kilgore has some questions.

Mr. KILGORE. I don't want to interrupt your chain of questions.

Mr. HOLIFIELD. My chain has now ended.

LIMITED WAR AT SEA

Mr. KILGORE. I want to go back to some of the comments on the possibility of a limited naval war.

While I sure don't want to argue, Admiral Burke, about our prospects of winning—I not only hope you are right, I believe you are right. I think from some of the questions the chairman asked, and some of your answers, we have assumed a lesser capability on the part of the Soviets than this Nation possesses in the antisubmarine warfare field. I think it has been somewhat demonstrated to us rather graphically that while we can hope, this has been a dangerous assumption for us to make in some fields in the past, but if it is true in this instance, what happens when they lose that limited war? Where do we go from there? Where do they go from there?

Admiral BURKE. They don't go any place, sir. If they could win it, they would take control of the seas, and if they lose it, they do just what they did in Korea, for example. The war just stops.

Mr. KILGORE. They lost that one?

Armiral BURKE. No, you don't really win or lose a limited war completely. Limited wars usually end with one side making some slight

gains, the other side being willing to accept those gains and not willing to continue the war to try to get other gains. Limited wars usually end in a sort of a stalemate.

Mr. KILGORE. What you would assume would be, when they lose it they would be unwilling to press it in any other theater or in any other medium because of their continued fear of our retaliatory capacity on the Russian mainland?

Admiral BURKE. That would be true, and because they won't get these Polaris submarines. They will fail in getting them.

If they started attacking submarines—suppose they got a submarine. They don't know which are Polaris and which aren't. We could put other submarines out, we could send our Polaris submarines down to some other place. We could pull them back. We could send them down to the coast of Latin America, or in the South Atlantic. We could pull them into our own harbors, and we could send one or two out. Keep enough out so that the enemy will be devastated. But he won't get them.

Mr. KILGORE. In the meantime we will attrite their submarines?

Admiral BURKE. We will attrite their submarines, and we will attrite their ships. This would soon probably degenerate into a naval war at sea. Something like the Armada. In the old days when they had a pretty good war at sea, and they never got far into the land areas.

ADEQUACY OF ASW FORCES

Mr. KILGORE. Do you have adequate support and adequate funds and facilities for your antisubmarine warfare mission?

Admiral BURKE. No, sir. I think no chief of staff ever has enough money, enough support, enough people, or enough talent, enough anything.

Our ships are old. Our biggest trouble now is the age of our fleet. Most of our fleet was built during World War II, about 80 percent. We have reduced our fleet this year from 864 ships to 817 ships in order to reduce maintenance, to reduce our personnel, to get money to put into new ships. We did that, just because we have to have new ships sooner or later. We have gone into a rehabilitation program which we call the FRAM program for rehabilitating some of the best of our older ships to give them an added life of 5 to 8 years.

Now, we have a group of people, very eminent people, very good people, civilians, working, examining our plans, our shipbuilding, everything we can about shipbuilding, to see whether or not we are on the track.

These are not shipbuilders, but they include people who are across-the-board scientists, and who have studied this sort of problem before. Not all of them are scientists. They should have a report within a month or so. We will use that report to determine what we will do under various circumstances. That is—if we can get our shipbuilding bill increased—we will be able to maintain our present level of shipbuilding. If it goes down, then we will have great difficulty. We will have to reduce our commitments in some places. That is, in some places we will not be able to do the things that we can do now.

One of the things that is important is to have numbers of ships, numbers of things.

This morning, for instance, we received two dispatches, one from the Indonesians, who thanked us for saving one of their ships. We had sent a ship down to rescue one of their ships which was aground. And the other dispatch was from Brazil, where they have had a tremendous flood. One of our ships happened to be coming back from the Antarctic and was nearby. We sent her in with her helicopters to do what she can to help.

These are entirely different things, but they show the need for numbers.

One wonderful ship wouldn't be able to do both of those jobs simultaneously. So you need numbers, and you need good equipment.

Mr. KILGORE. I would just make this comment, that I would certainly hope that in whatever general sum, and whatever level of program you feel you need in your antisubmarine warfare program, that you will call on the Congress for whatever you need.

I think in these times there is a very real danger in the public interest, and the congressional interest, being so heightened in these more sophisticated and glamorous fields of military roles and missions, that the less glamorous ones, but very, very significant ones, can be somewhat forgotten.

I know that in your operations in World War II, in the Pacific, you saw a situation where there was the feeling on the part of a whole lot of people that we were ignoring one theater to the expense of one, in an effort to press the war faster in another area. As one individual I again express a strong interest in this antisubmarine warfare program.

Admiral BURKE. Thank you, sir. It is most important.

PER MISSILE COST OF POLARIS

Mr. KILGORE. In the area of cost in the Polaris program, you are able at this time to carry a cost figure on a per-missile basis down to the Polaris program?

Admiral RABORN. Yes, sir; down to almost any standpoint. For instance, costs in dollars flowing from the Treasury when we first started our research and development tests, and we also have figures on the barebones cost of the missile at the moment.

Mr. KILGORE. Can you say at this time, Admiral, what you anticipate the cost of a Polaris missile, on station, will be; that, of course, would take into account the cost of the entire weapons system. I assume the cost of the weapons system divided by 16 or some such computation.

Admiral RABORN. I don't have it, but I can provide it for the record.

(The information received is as follows:)

ANTICIPATED COST OF A POLARIS MISSILE ON STATION

1. Weapon system research, test, development, and production costs for $8.645 billion for a 45–SSB(N) program. This includes almost $2.0 billion for weapon system development from the beginning of the program in 1955.

It is emphasized that the costs are based on hard-cost information resulting from almost 4 years of experience. Specifically, these costs include in their entirety:

1. Weapon system research, test, development and production costs for the missile, fire control, navigation, communication, and launching for a 1,500-nautical-mile system.

2. Construction of submarines, installing equipment, and checking out the operation of the submarine-weapon system.

3. Maintenance and operational training of Navy personnel.

4. Constructing submarine tenders, equipping them, and verifying their suitable operability.

5. Construction and equipping of the overall system production facilities including buildings, production and inspection tooling, maintenance facilities, etc.

6. Necessary operational support facilities such as the Naval Weapons Annex (the missile-outloading facility), crew-team trainers, special communications stations, etc.

7. Pay of personnel and material required to manage the overall FBM system.

8. Manufacture checkout and assembly of 16 missiles for each of the 45 submarines.

9. Manufacture of spare sets of missiles for the submarines for support purposes.

10. Spare parts for the entire system plus setting up issuing stations.

11. Tools and equipment to provide weapons system overhaul capability to Navy yards.

In summary, these figures represent total costs incurred to bring this missile system into being in its entirety. There are no hidden costs.

The studies referred to in the first paragraph reflected procurement of 1,005 missiles. Dividing 1,005 into $8.645 billion, the cost per Polaris missile comes out at $8.6 million each. Assuming ship-fill missiles only, 45 times 16 equals 720 missiles, the cost per missile in each SSB(N) tube is $12 million.

Subtracting costs to develop and bring into operation the first nine FBM weapon systems, the cost per missile in each tube for the remaining 36 submarines is $8.8 million.

Polaris is conservatively funded. Prorated costs for a 45-boat capability over an indefinite period of useful life (15 years and more)—$1 billion per year.

This includes—

(1) Replacement of missiles at 5-year intervals;

(2) R. & D. for longer range missiles and for future changes as may be required to keep it effective with time;

(3) Replacement of submarines at end of useful life;

(4) Normal operating expenses; and

(5) Other items such as support now budgeted under Polaris.

The following data indicates approximate costs, time, and personnel for Polaris missiles in surface ships:

	Approximate costs [1] (millions)	Conversion time	Personnel
Guided missile cruiser (CG):			
Lead ship	$49	8 months delay in current conversion of U.S.S. *Columbus.*	45, including 4 officers.
Follow-on	37	12 months	
Heavy cruisers (CA) (for reserve fleet ships):			
Lead ship	186	24 months	1,030 enlisted men and officers. 50, including 5 officers, for POLARIS only.
Follow-on	155	do	
Merchant ship (Victory):			
Lead ship	76	24 months	200 enlisted men and officers. 60, including 6 officers, for POLARIS only.
Follow-on	58	do	

[1] Costs do not include either missiles or production support. Neither additional production nor operational support required for 1 ship.

FINANCIAL MANAGEMENT OF POLARIS

Admiral RABORN. These figures are as complete figures as you can get on any weapon developed by anyone.

In the Polaris program it is the only program that I know of where every dime spent goes through a single pair of hands, and those are mine. We pay for everything. We get our money in a package, and it is given to me in a management fund, so this is one program where there are no hidden costs. It is also one program in which we can get firm figures because we are in production and buying things.

Mr. KILGORE. So that your final cost figure will be what we can refer to as a fully distributed cost? It won't be an out-of-pocket cost. It will include a development cost?

Admiral RABORN. Yes, sir; and it will be actually a hard cost and not an estimate.

Mr. KILGORE. It will be from a computer and not an estimate.

Admiral BURKE. This cost will be something less than $8 billion for a total of 45 submarines, and that is complete with all the training facilities, tenders, and everything else.

Mr. RIEHLMAN. Billion, Admiral?

Admiral BURKE. Yes, sir; for a total of 45 submarines. I know Admiral Raborn is going to object to that because it isn't quite that $8 billion, it is $7 billion something.

CONTINUITY OF GOVERNMENT

Mrs. GRIFFITHS. Admiral, by statute the President is the person who determines if we detonate nuclear bombs; isn't he?

Admiral BURKE. Yes, ma'am.

Mrs. GRIFFITHS. The other day when the Civil Defense people were in here we learned that actually every man, every civilian, is going to be on his own for a week or 2 weeks after a nuclear attack.

Supposing that the first bomb that strikes—and it is not an unreasonable assumption—kills the President, the Vice President, and the Secretary of State. Will every man at one of these missile bases who survives, or on a Polaris submarine, be on his own to fight this war?

Admiral BURKE. No.

Mrs. GRIFFITHS. Well, what happens?

Admiral BURKE. There are very elaborate rules and we take training in this. If the President is killed, the Vice President is killed, and a next man is always appointed. No local individual can take the thing in his own hands. Somebody is going to be left alive, either in Washington or in one of the areas which has not been destroyed. He will be the ruler to determine it. That is the nice part about the Polaris submarines, though. They don't have to be in a hurry. They don't have to get excited because they aren't going to be destroyed in the next 5, 10, or 15 minutes. They can get the word slowly or fast. Five minutes doesn't mean so much to them. It means something in striking the targets, but not to their own existence.

Mrs. GRIFFITHS. And something in giving the other country a chance to seek shelter?

Admiral BURKE. It could, but you can shoot these things in a minute.

Mrs. GRIFFITHS. Thank you.

Mr. HOLIFIELD. There is the line-of-succession law which we passed, which goes into effect.

Now at this moment I think it goes from the President to the Vice President, to the Speaker, and then I believe it goes down through the Cabinet officers, according to the law we passed just a year or so ago.

Mrs. GRIFFITHS. It is not inconceivable that they will all be dead.

Admiral BURKE. They won't all be dead—well, they might all be dead, but you have a line of succession.

Mrs. GRIFFITHS. It is entirely conceivable that at the last minute everybody in charge of a missile is going to be fighting the war by himself. He is going to be the commander in chief. You believe somebody will survive?

Mr. KILGORE. Somebody will be on a junket.

Admiral BURKE. I ran a drill one time where I kept in my pocket the location of individuals, all the time, just to see how much they moved. I gave it up after a while because I couldn't keep the thing up to date.

INCREASE OF ATTACK DUE TO BASE HARDENING

Mr. HOLIFIELD. Admiral Burke, the subcommittee of the Joint Committee on Atomic Energy made a study of hypothetical attack on the United States, in which some 1,456 megatons were dropped on 224 targets. Have you had a chance to look at that report?

Admiral BURKE. Yes, sir.

Mr. HOLIFIELD. And the maps?

Admiral BURKE. Yes, sir; I have looked at the maps.

Mr. HOLIFIELD. I believe it is D plus 2 days on that map.

Admiral BURKE. Yes, sir.

Mr. HOLIFIELD. One reason we have been concerned about these hardened bases is the coverage of the United States by radioactivity as a result of the attack on military bases, and we will have some testimony this afternoon that will indicate the additional megatonage that would be necessary to knock out a hardened base compared to a soft base. This will be unclassified testimony, of course, but it will present computations that have been made by scientists who have knowledge of this matter.

Now has the Navy made any study of the effects of a type of attack heavy enough to knock out hardened bases—of the result from the standpoint of additional radioactivity on the population of the United States?

Admiral BURKE. We study other people's studies on that, primarily. We have assisted in some of these studies. That is, what fallout will do to the United States—random drops of bombs, or weapons, the striking of just military bases, or hitting at cities.

Actually, this doesn't affect Navy operations as much as it does other forces, but the amount of fallout is just about proportionate to the amount of fission weapons, the megatonage of fission weapons. Not quite, but about that, and it is dependent upon whether or not it is a ground burst, or an air burst, and other factors.

If the enemy were to choose to launch more missiles at any site——

Mr. HOLIFIELD. Any particular fixed-hardened base.

Admiral BURKE. If he launches more missiles on the United States you get more fallout and you get more casualties, and the casualties, depending upon the time, are just about proportional to the amount of fallout. I mean, if it is widely spread.

Mr. HOLIFIELD. To a certain extent, a target is a magnet for attack, is it not?

Admiral BURKE. That is correct.

Mr. HOLIFIELD. If the magnet is of a nature that requires additional megatonage to knock it out, does it by its very nature become a more dangerous magnet when you consider the resultant radioactivity?

Admiral BURKE. Yes, sir; it does.

Mr. HOLIFIELD. In your Polaris philosophy or methods of warfare, the attractiveness of a military target is diminished considerably?

Admiral BURKE. Yes, sir.

Mr. HOLIFIELD. I am speaking now from the standpoint of being able to predetermine a fix on it and expend maybe 20 to 30 times the megatonage that would be expended on a soft base.

Admiral BURKE. Yes, sir.

Mr. HOLIFIELD. We had testimony yesterday that a hardened base would require from 10 to 30 times as much megatonage as a soft base.

Admiral BURKE. That is dependent upon the CEP.

Mr. HOLIFIELD. Upon the CEP, the extent to which the base is hardened, the accuracy of the weapon, and so forth. But this was a formula or computation which was made in open session, that it would run from 10 to 20 times as much. Now if those fixed bases are upwind, and adjacent to populated areas, this would automatically mean there would be a tremendous dumping of radioactive material on the downwind areas.

Admiral BURKE. That is right.

Mr. HOLIFIELD. And on the rule-of-thumb formula of a thousand square miles of lethal contamination to a megaton of fission, you can readily see if it took 30 megatons, for instance, for a specific target, that you would have a tremendously increased contaminated area downwind from that particular target, if it ever came to the point of trying to obliterate that target.

Admiral BURKE. Yes, sir.

Mr. HOLIFIELD. Is this an important factor in the Navy's thinking in relation to the desirability of the mobile and secreted base?

DISPERSAL OF TARGETS

Admiral BURKE. Yes, sir.

Before we ever went into Polaris, as such, we made studies. Studies were made by other people, and that is one of the reasons why we felt that it was important to get ballistic missiles to sea, because it does not draw any fire on the United States.

It is also one of the reasons why it is important to disperse, not only within the United States, so the United States does not become the only attractive target; it is important, I think, to disperse even the land-based launching sites.

VALUE OF SHELTER

Mr. HOLIFIELD. Now, we are faced, however, with a program which does envisage the setting up of a number of Atlas and Titan bases, hardened bases within the United States. This particular study indicated that 50 million people would be killed without shelters. With

the type of an attack that would occur as a result of hardening, say, 15 or 20 bases, it would have to be, if it was effective, a much heavier attack than this particular attack.

In the face, then, of our present war plans and our present and planned construction program, will it not be necessary, if the population of the United States is to survive, for them to have shelter in such an event from the radioactive yield?

Admiral BURKE. Yes, sir. It follows automatically, because if they don't have shelter you are going to lose a lot more people.

Mr. HOLIFIELD. I am asking you this question now, personally. You are a man with a family, are you not?

Admiral BURKE. Yes, sir.

Mr. HOLIFIELD. You have a wife and children?

Admiral BURKE. A wife; yes, sir.

Mr. HOLIFIELD. Would you feel safer if you knew that while you were at sea on duty she had a prepared shelter?

Admiral BURKE. Yes, sir; you have me on the horns of a dilemma here, sir, because——

Mr. HOLIFIELD. I am asking you to answer a question personally, now. I understand the administration's position against the shelter program, but now I am putting it to you on a man-to-man basis.

Do you think under the conditions as predicted here, and which would be much more severe in the case of a multiple hardened base in the United States, that the people of the United States should also be hardened along with the bases?

Admiral BURKE. Yes, sir; I do.

Mr. HOLIFIELD. As to how that is accomplished, that is another problem.

I am not going to ask you how it should be accomplished, but would you feel safer from the standpoint of the continuity of our Nation if the people—if it comes to the last desperate act of nuclear war—if the people of the United States had shelter from radioactivity?

Admiral BURKE. Yes, sir; because of charts like this over Russia, too, and because I believe if we are reasonably foresighted we will always be able to destroy Russia the same way, or maybe even better, and the probability of a nuclear war is very remote because there is nothing that you can gain by starting a nuclear war except your own destruction.

Mr. HOLIFIELD. As long as deterrents deter this is true and, of course, the study was made on the United States because we as a congressional committee did not want to be accused of warmongering against another nation. We didn't lay the pattern on another nation but it was plainly stated throughout the hearings that not only did this apply to the territory of the United States, but it would apply to the same spread of weapons on equivalent territory anywhere in the world.

MORALE VALUE OF SHELTER

Admiral BURKE. Yes, sir. It is like our gun mounts, sir. This is a simple analogy. We used not to protect our gun mounts. They were all open mounts. Then before World War II we put a very little bit of armor around these gun mounts. It increased the weight, but we did that for two purposes: One, we saved a lot of people from

fragments, and from the small direct hits. It didn't save them all. If they got a direct hit, they lost. They were killed. But it saved quite a few people. It cost us quite a bit. It kept up the efficiency of the thing, however. It helped them. They fought better because of that small amount of armor, and we had a lot of people come out of the war who otherwise wouldn't have come out if we had open gun mounts.

Mr. HOLIFIELD. You and I both know that this kind of attack could occur, and we also know that the inventories of weapons in the nuclear nations are sufficient to make it X times this amount of attack, as far as megatons are concerned. We are not saying how much, but we know it could be much greater than that.

But this kind of an attack showed 50 million people would lose their lives and 22 million people would be injured. It also showed that if they had been under 3 feet of earth, if they had had shelters and were able to get into them in time, there would have been only 5 million people lost. In other words, you saved about 90 percent of your people with underground shelters, where as you lost them if you didn't have shelters, as we do not have at this moment.

In the face of those figures, and your own knowldege of the capability of destruction of atomic weapons, would you say that if the United States did have underground shelters for their population, this would add to the deterrence factor? Would it be a factor in deterring another nation from striking if they knew we could survive an attack, or if they could not knock us out?

Admiral BURKE. Yes, sir; because of one thing: Stamina. Stamina of people is going to determine the outcome of this conflict that we are now in, and it will be stamina. I don't think the stamina in general war will ever be used—in general war. But stamina will be used, and it will be the most important thing in all other kinds of things. And anything that causes people to have a knowledge that they have a good chance, and there is no reason for fear and they can act with confidence, they can act with pride——

Mr. HOLIFIELD. In other words, it gives us a firmness of national morale and national fiber if we know that we can afford such a risk without destroying our population?

Admiral BURKE. I think so, sir.

To carry it a little further, though, to get on the other side of the fence, people have to do a lot for themselves.

MILITARY RESPONSIBILITY FOR SHELTER

Mr. HOLIFIELD. We are not going into the methods of who should do it. You know, if you left it up to the people to form a military defense department out of their own pockets, you wouldn't have a defense department. You know the Defense Department exists for the constitutional reason of protecting the life and the property of the United States; does it not?

Admiral BURKE. Yes, sir.

Mr. HOLIFIELD. That is its reason for being.

Admiral BURKE. I was thinking of my grandfather, sir, who went out to the western plains and——

Mr. HOLIFIELD. Your grandfather wasn't faced with nuclear fallout.

Admiral BURKE. Yes, sir; but he was faced with a lot of other things, and he defended himself.

Mr. HOLIFIELD. But the people of the United States cannot defend themselves militarily today because the technology of weapons has gone beyond the technology of the weapons of your grandfather and my grandfather.

Admiral BURKE. That is true; yes, sir.

Mr. HOLIFIELD. Therefore, we have a centralized responsibility which is in the Defense Department of the United States, to do the job which the individual citizen cannot do of his own volition.

Admiral BURKE. Yes, sir.

Mr. HOLIFIELD. So we are facing a different kind of a world today than when we faced in the days of our grandfathers.

Any further questions, Mr. Kilgore?

Mr. KILGORE. Yes.

VALUE OF SHELTER IN DETERRENCE

Mr. HOLIFIELD. Just let me say this: General LeMay yesterday in his testimony spoke about three factors of deterrence, and the third factor he spoke of was an adequate civil defense that would protect the population of the United States, as a factor of deterrence.

The President has said that this would be a great factor of deterrence in our overall defense posture. No one is asking to minimize or cut down on the military defense. Most of them feel it should be stronger than it is. I am sure all of this committee does in the submarine field, anyway. The nuclear submarine field, as well as some other fields, but particularly the nuclear submarine field.

But this committee is concerned with this factor of deterrence, saving the lives of the people of the United States as a matter of human concern, and as a matter of overall deterrence in our strong posture in the world.

Admiral BURKE. Yes, sir.

POLICY ON SUBMARINE CONTACTS

Mr. KILGORE. I have a clipping out of last Friday's Evening Star, which referred to an alleged discussion within the Joint Chiefs of Staff about a proposal to establish a "shoot on contact" policy toward unidentified submarines cruising near this country—that this sort of policy was being studied. It reported an Air Force position, a Navy position, and Air Force position in support of it, and a Navy position in opposition to it.

I just wondered if you would care to comment on the story.

Admiral BURKE. Whoever wrote that article has advance information that we don't have. It says the Navy position is against the shoot on sight at sea?

Mr. KILGORE. Navy sources say privately they don't think much of the Air Force position, and the Air Force's position is recited earlier as with or without such policy some Air Force circles suggest a silent hot war could break out between America and the Soviet Union in the undersea no man's land. The Russians have shown their willing-

ness to shoot down American planes and risk retaliation and world public opinion. So these officers say, still referring to unidentified Air Force officers, "they can expect to destroy Polaris subs whenever they find them."

Admiral BURKE. I think whoever the Navy spokesman was knew what he was talking about. He was correct.

From time immemorial there has been freedom of the seas. The freedom to carry on commerce, to help one another at sea, and no man and no nation owns the seas. The custom of the sea is if one ship gets into trouble you help them out. Just like we helped these Russians on this landing craft.

If you get an opportunity to help, you must help. There is nothing worse for a captain than to not pay attention to an S O S signal, for example. They all go, whether they can really do anything or not.

Actually, it wouldn't do any good to declare a wide area—supposing we had a 500-mile area, and we said that any ship that gets within 500 miles of this coast and doesn't obey our rules, whatever they are, we will sink. That is not just the people we don't want there, it is all people. We would say "Everybody does exactly what we want in this area."

In the first place, our friendly nations wouldn't do it. It would interfere with our coastal trade. In the second place, we couldn't do it because we wouldn't have enough ships to insist upon that. It is like a blockade which is only legal if it is tight. If you can establish a blockade in war, providing you can establish it and keep it right. But if you can't keep it tight, it is illegal. The same thing would be true here. You couldn't cover that much area.

The third thing is that if you put it out to 500 miles, what do you do at 525 miles, if they have a 700-mile missile? If you put it out to 700 miles, what do you do at 780? In other words, you can always go on and on and on and on until the ultimate rule like that would be that the nations would wack up the oceans and say "This much ocean belongs to the United States, this much ocean belongs to England, and nobody will come in my part of the ocean unless I say so."

Mr. KILGORE. We would assume they would apply the same sort of rule to us.

Admiral BURKE. Sure. And we would say "You don't own that ocean, so we are going in there."

Mr. KILGORE. I am inclined to agree with your view.

Admiral BURKE. Yes, sir. That wouldn't work. We haven't gotten the paper yet, though, sir. I haven't made the study yet. We will study it when we get the paper.

Mr. KILGORE. I was somewhat interested in the story since it attributed views to the various departments within the Department of Defense.

POLARIS COST DATA

I have made a rough calculation and I am no mathematician, or have no particular competency in cost accounting. I would be very interested, Admiral Raborn, in your detailed figures. I arrived at a conclusion here, without, as I say, a great deal of competence, that if you could assume the validity of the $1.2 million fully distributed cost in the Minuteman, and the approximate $160 million total cost in a Polaris submarine, equipped and on station, that it would require a sur-

vivability of over 12 percent of the Minutemen to reach a break-even cost. Assuming 100 percent survivability of the Polaris submarine and 100 percent on station, in order to give this comparable cost, and that wouldn't on its face appear to be a likely figure. I would be interested in additional cost data.

Admiral RABORN. Costs are extremely important, and we are ever mindful of them.

There is one thing we must always be watchful of, however. For instance, I like to draw a comparison between a man who in everyday life want to buy some transportation to go to and from his home to work. He goes down to one of the three low-priced cars, and he prices each of them out. One is $15 cheaper than the other. When he takes a good look at it, he finds that one doesn't happen to be a very good model that year. Saving the $15 then is not a good investment. In other words, you have to look at what you buy in its entirety rather than any initial first savings no matter how attractive they may be.

One of the nice things about the Polaris weapons system in submarines, as well as in surface vessels, is that the missile is the delivery element, and the useful life of a submarine is something of the order of 15 to 20 years. By putting in improved or new missiles at periodic intervals, the delivery system is just as good as the day it came off the building ways because it is the missile that does the performance.

We are very fortunate here. We have a three-stage missile. The submarine can be considered the first stage because they can be relatively close to prospective targets. If you wish, it is quite conceivable that they could be the first to put their warheads on the target. This first stage is a very intelligent, even recallable submarine we are talking about. It is a very intelligent and even recallable first stage.

There are a lot of factors which are difficult to equate and if we get too fascinated with just dollars, we are likely to come up with some very bad answers from the point of view of worthwhileness.

Mr. KILGORE. I certainly would agree that cost is not the only factor. It is certainly not controlling, but my interest in it was directed to it by the earlier comment that the Polaris would be probably by far the cheapest missile approach, and this rough computation made it look to me like it probably was on the order of 8 to 1 more costly, if those computations were accurate, than, say, the Minuteman, and I just thought that the record ought to be upgraded with the most accurate information on cost.

Admiral RABORN. It is difficult to get comparable figures, and I am sure the Department of Defense in their overall position have tried this very sincerely, to equate these to a common base. They are entirely different systems, and they want good figures.

In many cases we are talking about and trying to cost out systems that are not yet well along, and it is difficult to give good figures. I know we were in that same position at one time. We are now in a different position.

Mr. KILGORE. Having wholly reliable and accurate cost figures?

Admiral RABORN. Yes, sir; because we are producing, and the Congress gives us money all in one package, and you can hardly get any more clean cost accounting than that.

Mr. KILGORE. I will certainly be interested in receiving those.

RELOAD CAPABILITY FOR MISSILES

Mr. HOLIFIELD. Could I ask you a question here? Are the hardened bases of such a nature that they can be used after one missile has been shot out of it? Can they put another missile in immediately and shoot it?

Admiral RABORN. I think in most cases they can be, sir, if you wish to.

Mr. HOLIFIELD. In the Polaris this is also true. Assuming you had fired 16, if you could get refilled you could go ahead. In other words, the base, itself, is not damaged by firing?

Admiral RABORN. Not a bit. We have some mighty fine hardening in that submarine by merely doing what comes naturally to a submarine, and that is submerging.

LAND-BASED POLARIS

Mr. ROBACK. What is the land capability of the Polaris? Have you built a land-based missile?

Admiral RABORN. We have. Practically all our missiles have been fired from the land.

Mr. ROBACK. Could you build a Minuteman quicker than the Minuteman by calling it the Polaris?

This is not a facetious question. Could a relatively small additional development cost bring the Polaris quickly to the same place the Minuteman wants to reach in later years?

How much time, how much cost, how much effort would it take to make a land-based Polaris which would perform the function that is scheduled for a Minuteman, which is a second generation missile, which has several years to go before it is produced, and has other problems attached to it?

Admiral RABORN. I think you would have to start from scratch as an offhand answer, sir. This is something that you just can't give a good answer to without a great deal of technical study, because you have an entirely different environment when you use something for one purpose.

Mr. ROBACK. We are talking to you now as a missileman. A missile builder. You have a different environment, but is it more difficult to build a Minuteman than a Polaris?

Admiral RABORN. There are entirely different problems.

Admiral BURKE. Perhaps I should answer that question, sir.

The Minuteman is very long range. To get that range you would have to add another stage and would have to make a much bigger missile. By doing that you would change the characteristics. You would make it bigger.

Now, we could make now a Polaris land-based version easily enough, with the same range that we have now. There is no difficulty in that at all. That is easy.

Mr. ROBACK. You could have added to the Jupiter and the Thor?

Admiral BURKE. They were there first, of course. They developed theirs first. But there would be no difficulty in getting a missile of that range, on land. But when you get the long range, we would probably have to do about what the Air Force is doing, because they have all the dope that we have, they have all the information that

we have, and I am sure they are using it all. If we wanted to build a missile of that range we would end up probably with something that would look very much like their plans for Minuteman.

RANGE OF POLARIS

Mr. HOLIFIELD. Admiral, are you permitted to tell us what the goal is, in range, of the Polaris?

Admiral BURKE. Yes, sir. As you know, we have 1,200 miles range in this missile we have now. We have within 2 years—we will increase that to 1,500 miles, and then we hope by additional research we will expect to increase that range significantly. Maybe 2,000 or 2,500 miles.

Now, this doesn't mean that we will be able to hit any more targets. We won't. With a 1,500-mile missile we can hit all the targets we want to hit, but what we will be able to do is to hit them from different areas, and it will give us greater flexibility in our operations.

Mr. HOLIFIELD. Did you say your present goal was 1,200 miles, or your present capabilities?

Admiral BURKE. We have reached 1,200 miles.

Mr. HOLIFIELD. That is your present capability?

Admiral BURKE. That is right. Next is 1,500 miles. No technical breakthroughs have to be made to reach that, except some good engineering.

SOLID PROPELLANTS

Mr. HOLIFIELD. Is your solid fuel propellant improving as you go along?

Admiral BURKE. In specific fuels; yes, sir. We made significant improvements about a year or so ago.

Mr. HOLIFIELD. It is burning regularly, now?

Admiral BURKE. Yes, sir. We had difficulty naturally at first, but we have overcome such difficulties. We are now trying to improve the specific impulse which we will be able to do, but that will take a lot of research.

Mr. HOLIFIELD. The safety factor in storage; is that satisfactory?

Admiral BURKE. Yes, sir.

Another nice thing about the ship is that you can control temperature very accurately. We thought we would have to have fairly good temperature control on these solid propellants. Actually, the propellants work very well in a much wider range temperature than we anticipated.

Mr. HOLIFIELD. Who is your principal supplier of solid propellent fuel?

Admiral BURKE. Aerojet-General.

Mr. HOLIFIELD. Is Thiokol still making it?

Admiral RABORN. Thiokol, Aerojet-General, Hercules, several other people are in the field, sir.

VALUE OF LONGER RANGE POLARIS

With regard to the longer range missile on the order of 2,500 miles, our studies indicate a tremendous improvement in the flexibility of the submarine as to amount of water. You increase threefold the amount

of water for submarines to be in and keep targets under surveillance by 3 million to 9 million square miles of ocean.

This is significant improvement in sea room in which to operate your submarines, and would lessen the difficulty in operating the submarines. It is something like three times the size of Texas.

Mr. KILGORE. Conversely, then, if you operated in the same sea area you would have a far greater striking force control over targets?

Admiral RABORN. That is right; that is right. Tremendous flexibility would be added.

Mr. HOLIFIELD. Is the submerged capability scheduled for the first operational units of the submarine fleet?

Admiral RABORN. Yes, sir; that is extremely well proven out. We have all the competence required for this at the moment.

Mr. HOLIFIELD. Any further questions?

Mr. KILGORE. I have no further questions.

Mr. HOLIFIELD. We will conclude our hearings, gentlemen, and we want to thank you, Admiral Burke, and Admiral Raborn, and your staff, for being here today. You have given us some very thought-provoking testimony, and we appreciate it very much.

This afternoon at 2 p.m., the subcommittee will hear Dr. Ralph Lapp, who will present testimony on the civil defense implications of our hardened missile base program.

(Whereupon, at 12:30 p.m., a recess was taken until 2 p.m. of the same day.)

AFTERNOON SESSION

Mr. HOLIFIELD. The subcommittee will be in order.

We are honored to have as our witness this afternoon Dr. Ralph E. Lapp. Dr. Lapp is a distinguished author and lecturer, and a physicist in his own right. He has had a long acquaintance with atomic matters from the days of the Manhattan project when we were making our first atomic weapon. Dr. Lapp has also been a prior witness before this subcommittee, a consultant to the committee and staff of the Joint Committee on Atomic Energy on occasion, and a participant in panel discussions before the Joint Committee on Atomic Energy.

Dr. Lapp, we are glad to have you with us today, and I understand you have prepared testimony. You may proceed.

STATEMENT OF DR. RALPH E. LAPP, NUCLEAR CONSULTANT

Dr. LAPP. I believe you have an original of my testimony. Mr. Brewer has it.

I am sorry time did not permit my getting a mimeographed version of my statement. My testimony will consist of two parts. The first part will be directed to the problem of external radiation hazards from fallout, the second part to internal hazards from local fallout, and the third part will deal with the valuation of the fallout associated with attacks on ICBM bases.

The first two parts are in the nature of leading up to the technical evaluation of the fallout hazard in the local area.

I will not read them in their entirety, but I felt that it was useful to introduce them into the record, especially after I heard the testimony earlier this week relating to the use of t to the minus 1.2 ($t^{-1.2}$) law, which seems to be quite indelibly fixed into all civil defense discussions. At my last appearance before this subcommittee I indicated how the $t^{-1.2}$ law would involve dosages per unit time.

Since that time I have testified before the Joint Committee on Atomic Energy, giving a new estimate I made of what one can realistically expect in the fallout area in terms of new theoretical calculations by the National Bureau of Standards, the Atomic Energy Commission, and the U.S. Naval Radiological Defense Laboratory.

This has been coupled with experimental data released by the Atomic Energy Commission on the local fallout in the Marshall Islands. What I have done is essentially to rationalize these data in order to give what I believe to be a realistic estimate of the change of radioactive fallout hazard with time. In the process of making this analysis I came to the rather interesting and startling conclusion that the amount of radiation hazard which one will be presented with in the first hour from a standard reference amount of fallout, namely, the debris for 1-kiloton explosion distributed over 1 square mile, ran twice or three times the values previously used, such as used in the "Effects of Nuclear Weapons." This was very startling, and these data were presented to the Joint Committee on Atomic Energy, and I believe were used by the Joint Committee.

(The table referred to is as follows:)

TABLE NO. 1

Time interval	Radiation dose (roentgens)		Time interval	Radiation dose (roentgens)	
	$t^{-1.2}$ rule	New estimate		$t^{-1.2}$ rule	New estimate
1st day	4,000	4,000	4th month	240	60
2d day	1,400	950	5th month	180	40
3 to 7 days	2,080	1,320	6th month	130	25
2d week	920	535	6 to 12 months	500	60
3d week	480	282	2d year	430	20
4th week	320	140	3d year	220	6
2d month	700	220	4th year	140	3
3d month	360	100			

Mr. HOLIFIELD. The new data were used by the Joint Committee. As you remember, Dr. Lapp, we asked that there be a new computation of the casualties as a result of the war exercise which we had planned at that time, and it did increase the amount of casualties by, I believe, a factor of about 20 percent at that time.

The casualties went up from 40 million to about 50 million.

NEW WEAPONS EFFECT HANDBOOK

Also, I might, for your information, tell you that General Luedecke called me last week and said that they are making a complete new weapons effect report which will be in a book similar to the previous one, and they are using, of course, new and more up-to-date computations in all of their calculations of weapon effects.

Dr. LAPP. I am delighted to know they are going to revise it. I am very much interested to know what the result will be.

I think it is extremely important to know the rate of radioactive decay, especially over the longtime period, let's say after 2 months. And if you calculate this on the $t^{-1.2}$ law, I felt that civil defense was a pretty hopeless problem, because the integrated doses that would be received if, for example, referring to table I, you had managed by some very fortuitous circumstance to avoid any type of fallout during the first week, and you then were fully exposed—that is, above the surface of the earth—for the second week, would be more than one lethal dose of radiation. If you managed by some very, even luckier accident to survive with no irradiation—zero roentgens—during the first 2 weeks—in other words, completely sheltered—then during the third week you would still be exposed, if you were above the surface of the earth for a full week, to another lethal dose.

As you go on in time it turns out that the new estimate shows that the rate of decay is much more rapid than had been estimated on the old $t^{-1.2}$ law. If you look, for example at table I, in the sixth month, whereas on the old calculation you received 130 roentgens, under the new calculation you would receive 25 roentgens, or five times less.

This difference becomes much more pronounced in the second year, when instead of 430 roentgens you would receive 20 roentgens. Now, that is a very, very appreciable factor, and it seems to me this was in the essential nature of good news, if one views the postattack problem.

SHELTER FOR ONE-QUARTER OF POPULATION

Mr. ROBACK. Mr. Chairman, I wonder if we could ask, in the light of this calculation, that Dr. Lapp comment on the statement of Governor Hoegh, who, using the $t^{-1.2}$ law, estimates that existing shelter spaces in the United States could probably take care—give adequate fallout protection to 25 percent of the population. Is there any significance in your calculation which bears upon the observation by Governor Hoegh?

Dr. LAPP. Well, I think that for the first week the two calculations agree fairly well, so there would be no difference with what Mr. Hoegh would state. I do believe that one has to make a difference between the rate of fallout and the dose. This is the difference between miles per hour and miles. For example, I have heard many people state that, well, if you wait a factor of 7 you will reduce the intensity 10 times. So, if you start with 4,000 roentgens, then at the end of 7 times 7 times 7 hours, which would be 2 weeks, the radiation would be a thousand times less, which would be 4 roentgens per hour.

Now, 4 roentgens per hour is very small compared with 4,000 roentgens per hour, but when you are exposed to 4 roentgens per hour for 24 hours in a day, and we have no control over that, that amounts to almost 100 roentgens per day, which is a serious radioactivity.

Mr. ROBACK. Governor Hoegh assumed 200 roentgens—he didn't say clearly whether that was cumulative dosage or first-hour dosage—that, based upon a 20-roentgen dosage, you could use that as a standard for fallout shelter protection.

Mr. HOLIFIELD. I believe, Mr. Roback, that his meaning was total exposure, accumulated exposure to 200 roentgens would be tolerable for the individual. In other words, there would not be radioactive

sickness as a result of that, and, of course, if it went on up above that, there would be radioactive sickness.

Mr. ROBACK. I don't believe his testimony was explicit that the 200 was cumulative. He didn't say exactly what time period was involved. He merely talked about 200 roentgens. Maybe the OCDM representative here can enlighten us on it.

Dr. LAPP. I would like to know specifically what he said, to comment on it.

Mr. HOLIFIELD. Yes. Let me have the transcript. For accuracy, we will read the testimony of Governor Hoegh. I will read the pertinent part of it.

They said that an individual can take 200 roentgens—

and he is referring in the word "they" to a subcommittee of the National Committee on Radiation Protection and Measurements.

They said that an individual can take 200 roentgens. It is most likely that he can take a dosage of 200 roentgens within a short period of time without becoming radioactively ill. If you get more than 200 roentgens it is most likely you will get radiation sickness, and if you got 600 over a short period of time it is most likely you would become deceased.

Those were the principles laid down by that committee. Based on that, we say that ever individual citizen must not be subjected to more than 200 roentgens, preferably much less. That is the caution we give the people.

Dr. LAPP. Well, it all depends, Mr. Chairman, on the definition of what a short length of time is.

Mr. ROBACK. If it is cumulative in a short length of time, that means you have no margin for exposure over a long period of time.

Mr. HOLIFIELD. It is cumulative over a long period of time.

Dr. LAPP. Yes, but my comment would depend on what he thought was the period of these 200 roentgens. For example, if he thought that 200 roentgen units could be allowed for a population in the first week of postattack living, then I think I would not like to go along with that, because this leaves you zero for the second week to the full year, and during that second week to the full year you are going to have a great deal of radiation.

So I believe that this is a matter of integrating over various periods of time, which I have broken down here. So that what you have to do in the shelter program is to achieve a maximum shelter-protection factor during the first and second days, because, for example, in this table we have a first day dose of 4,000 roentgens. If you would have a shelter protection factor of 100, which is not too difficult to achieve, that would give you a dose of 40 roentgens the first day. Now, the second day 14 roentgens would be added on to that. In the third through seventh days you would then accumulate 20 more roentgens for a total of 74 roentgens in the first week.

Now if 200 is stipulated for the first year of living, you then have a balance of 126 roentgens, which can be distributed throughout the rest of the year. Certainly, during the second month, for example, when you would receive a fully exposed dose of 700 roentgens, if you had a shelter-protection factor due to emergency of just 10, you would get 70 roentgens.

Mr. HOLIFIELD. At this point it might be a very good thing to clear up Governor Hoegh's reference to shelter spaces. This is what Mr.

Roback was talking about. Governor Hoegh submitted—I think we had better be fair with him and read exactly what he said:

As I mentioned yesterday to the chairman and members of this committee, our estimate is, as of today. there are shelter spaces with adequate fallout protection for over 25 percent of the people of America as of today.

That would mean that as of today there are adequate fallout shelters in the United States for 44 million people.

Dr. LAPP. Did he define the word "adequate"?

Mr. HOLIFIELD. No; he did not. Now, in defining what shelter space is, I said:

I would like to question the statement that you made that 25 percent of the people have shelter spaces. I would like to clarify what you mean by shelter spaces.

Mr. HOEGH. By that I would say there would be areas in which people would have, as a minimum, 12 square feet, and that that area would have a protection factor of over 100.

Mr. HOLIFIELD. In its present condition?

Mr. HOEGH. Yes, sir.

Mr. HOLIFIELD. Without modification?

Mr. HOEGH. Yes, sir.

Mr. HOLIFIELD. How would you reconcile that? Let us take some typical structures. A basement, for instance, with windows in it; would you consider that as being adequate?

Mr. HOEGH. No, sir.

Mr. HOLIFIELD. Would you consider an underground garage, like the garage in Union Park in San Francisco, for instance, as being one of those?

Mr. HOEGH. A subbasement; I would, yes, sir.

Mr. HOLIFIELD. What do you mean by a subbasement?

Mr. HOEGH. That would be the second layer below the surface.

Mr. HOLIFIELD. The second layer, regardless of the fact that the openings are open and not closed in any way?

Mr. HOEGH. You would have some place, even in the first layer, Mr. Chairman, but they would not be so freely usable as those in the subbasement.

Mr. HOLIFIELD. You would include in that, I suppose, the ordinary basements of framehouses that had no windows?

Mr. HOEGH. No. In that instance they would have to go one step further. If they had a basement with window wells, they would have to have had preparations made, as many people have, to close up the window wells with a cement slab, with sand bags, or with solid concrete blocks. In addition it would be necessary that they cover the floor above the shelter area of the basement either with dirt or sand or other heavy materials. Just throwing library books out on the floor would greatly increase its protection factor.

When you consider a massive structure—take an industrial building where you have cement floors all the way—in that instance, the basement, and the subbasement, if they had no exposed windows, would have that sufficient protection factor. However, if they had exposed windows, it would be necessary to have either the cement slab, the solid concrete blocks, or the sandbags filled either with earth or gravel prepared to close in these window wells. Many have taken that precaution.

Mr. HOLIFIELD. I am sure I agree with you that many places could be given an increased protective factor, but your statement of 25 percent of the population is predicated upon spaces which exist at this time to protect them. I do not question your sincerity in making the statement, but I question the accuracy of it, because from all the information we have received from people who should know—the people at the local level, the city and State level—their answers to our questionnaire do not bear this out.

Dr. LAPP. I think he has defined the thing I was looking for by saying the shelter-protection factor would be greater than 100. I have not made a survey of the metropolitan buildings to determine what their shelter factors are, so I cannot comment one way or another, although as a general observation 25 percent would seem to me to be a high figure, but that is just an off-the-cuff comment.

NECESSITY FOR PUBLIC DATA

I would like to conclude part 1 by saying again that if you use this projection of radiation dosage on this old law, $t^{-1.2}$ you are essentially dooming civil defense to almost a hopeless proposition over the long period of time, because you simply had to stay buttoned up in shelters, and you had to live a very guarded life thereafter for a very long time. Therefore, I think it is very important that the Defense Department, and the AEC, release the data on what is the most probable realistic value of radiation dosage. We have had some now 15 years of postwar experience, and it seems to me that on something like the gamma radiation from fission products we ought to have a lot of knowledge by now.

Over 100 bombs have been exploded; there has been plenty of fallout to get this. I would like to see that data really come out and be given as something firm, because I just noticed the last week that there was a statement made in New York City that at the end of 2 days you could come out of your shelter and everything would be essentially all right. I believe that was made by the New York Director of Civil Defense, General McAuliffe.

Mr. HOLIFIELD. The new policy line is, you know, to make it sound cheerful by studying strontium effects under the name of Project Sunshine. The new line is to minimize the effect of radiation, I believe.

Dr. LAPP. I think that the only sound position for anyone to take on radiation hazards is to present the facts, whatever they may be, and let them be understood by the public.

Mr. HOLIFIELD. That is what my various committees have tried to do.

LOCAL FALLOUT HAZARDS

Dr. LAPP. Now, on the second part of my testimony I want to state first of all that this problem of the internal hazards in local fallout is an extremely complex one to evaluate because of the many modes of entry of radioactive debris into the human system.

It may come in by food, by water, and by breathing. It is difficult to predict what the concentration of some of the gaseous isotopes, such as iodine 131 will be. But I think one of the fundamental rules in a locally contaminated area will be that you do not give the milk to the children for quite some period of time. In other words fresh milk would be banned because of the iodine 131 hazard. Iodine 131 has a half life of 8 days, so that it does die off, and as a rule of thumb, we say after six half lives, you can almost forget about it, unless there is a tremendous amount there. But you could still get the milk and convert it to powdered milk or to cheese, and allow natural decontamination, which is radioactive decay, to take place.

As I say, this iodine 131 hazard is not well understood, even though the British had an accident in England with the nuclear reactor and they got some data which they hadn't looked for.

This was the Windscale accident.

Mr. HOLIFIELD. Yes.

Dr. LAPP. Now, there are other short-lived isotopes. By short lived, I mean having half lives less than 1 year and I would mention strontuim 89, which has a 53 half life, barium 140, zinc 60, and these are examples of material that go into the bone.

However, they do not pose a long-term problem, and once they are there, the radiation dosage is reduced by natural decontamination, which is decay.

There is an interesting example of the material which is not formed from the debris of the bomb, itself. In other words, it is not produced by splitting atoms, but is produced by the neutrons from a bomb flashing out and irradiating material in the environment. We call this induced activity.

In the case of sea water, sodium 24 would be such a material. Radioactive chlorine and many elements can be induced in terms of radioactivity. One of these is zinc 65, which turns out to be rather interesting from the standpoint of marine concentration because it does tend to funnel up from microplankton right on up. We have had experience with the killer clams which seem to love the stuff and concentrate it by very high degree.

STRONTIUM 90 HAZARD

So that there are special cases of concentration hazards there. I would like, however, to make a short statement about the strontium 90 hazard, which would exist in the local fallout.

The Joint Committee on Atomic Energy has held two very extensive hearings on this, and the strontium 90 contamination problem as it affects the food chain has been described. I do not wish to go into all of the technology, but merely to state that the strontium resembles calcium in its chemistry and will therefore be picked up from the soil in much the same way as calcium. Strontium 90 has a long half life and it is born in high yield in modern thermonuclear weapons. A single kiloton of fission energy produces—a single kiloton would be 1,000 tons of TNT—100 curies of strontium 90. A curie is the unit of radioactivity.

Thus, if the two-thirds of the fission debris from a bomb with a fission energy of 6 megatons, in other words, 6,000 kilotons, if this were deposited we would have 4,000 kilotons or 400,000 curies of strontium 90 in the local fallout. This would be distributed over an area of many thousands of square miles, depending upon the wind.

One would expect that the level of strontium 90 would exceed 100 curies per square mile over a large area. The potential, if this were uniformly distributed, would be a strontium 90 contamination of 100 curies per square mile over 4,000 square miles.

If you have multiple impacts of high-yield megaton weapons on, let's say ICBM targets, you could produce overlapping fallout patterns in which the strontium 90 level would be increased due to the overlay of these various fallout patterns.

In such cases one would expect that the strontium 90 level would go up to kilocurie amounts, that is 1,000 curies per square mile.

Now, we are faced with the not-too-easy problem of translating these curies per square mile into what it would do to you and me. This is not easy and I would like to take the following method of doing it, giving several approaches.

We have got somehow or other to convert these numbers into an estimate of biological damage to be expected from some level of contamination. From the standpoint of postattack living, it would be

desirable to have some kind of a limit above which you would not use the land for agricultural purposes.

It would be desirable, but I am not too sure whether we could get an agreement on this and I am not too sure whether the conditions in postattack life, the degree of our coordination, would allow us to make the kind of measurements that would be essential for finding out what the contamination was.

But assuming this could be done, we would then have to relate the level of fallout in this local area to what we would expect in people.

Now, we will do this first of all in terms of the physical measurement. We have had quite a few nuclear tests in the air and this debris has been scattered all around the world.

We have in the northern United States test fallout which amounts to about 100 millicuries, that it would be a 10th of a curie per square mile.

Now, using a high figure deliberately so that I underestimate the hazard, I further assume that the contamination that results from that will result in an average of 10 strontium units—the strontium unit has been defined before this committee, I believe—at the time of maximum uptake in the body. We can then equate as a rough estimate: one-tenth of a curie equals 10 strontium units, and on this relation we can say that where you had 100 curies you would expect there would be an uptake or a retention of 10,000 strontium units in the human body.

Now, mind you, the things we are worried about now from fallout from tests are 10 strontium units and this would be a thousand times more. Even more than that, in the case of very heavy contamination.

Ordinarily, one would expect a value of 100,000 strontium units if people drew their food supply from a high contaminated area exclusively. That might be the case if the people had to live off the land because of the lack of transportation.

There are two ways of evaluating the strontium 90 hazard in order to make strontium unit more understandable. The first rule is that we can say that 1 strontium unit (s.u.) delivers 3 millirads per year to the bone, the rad here begin defined as the absorption of 100 rads of energy per gram of body tissue. It would be slightly different from the roentgen, so it would be easier if we used the roentgen unit.

Thus, a 10,000-strontium-unit value would equal 30 rad/yr or 1,500 r per 50-year period.

Second, the problem can be cast in terms of m.p.c.'s, or maximum permissible concentrations. At the last (1959) hearings of the Joint Committee on Atomic Energy, the Atomic Energy Commission used a value of 67 strontium units as the maximum permissible concentration for a general population.

Thus, a value of 10,000 strontium units would be 15 times the general population maximum permissible concentration. However, a recent report of the National Committee on Radiation Protection recommended in a tentative manner that general population levels be set in relation to the natural background which is 100 mr per year.

It also recommended that maximum permissible concentrations should take in account the effect of other radioistotopes present and

not concentrate solely upon the single isotope. If one takes these two considerations into account, it is possible to arrive at maximum permissible concentration of 16 strontium units instead of 67 strontium units.

Survivors in the postattack period would have to weigh the risks of future damage from ingested and retained radioactive material in relation to their previous exposure and, of course, to their need for food. A starving person will not worry excessively about strontium 90.

As for the biological damage from strontium 90, we know from animal experiments that it can induce bone tumor and cancer. There is no body of data on humans and it is difficult to transfer the animal data.

The only pertinent data on retained radioactive isotopes with humans is in the limited experience of people who have retained radium in their skeletons as a result of their profession of radium dial painters or as a result of being exposed to medical therapy, when they were injected with radium to cure them from various diseases, rheumatism and other things.

Based upon a comparison of radium body burdens and observed injury, it would appear that a level of 10,000 strontium units would probably be very serious but would not be catastrophic as related to the numbers of casualties and mortalities in the nuclear attack.

Now, I come to the section dealing with the problem——

Mr. HOLIFIELD. Before you go into that.

Dr. LAPP. Yes.

GENETIC HAZARDS

Mr. HOLIFIELD. I brought out the point, after Governor Hoegh's testimony on the 200 roentgens, that he was speaking there strictly from a somatic standpoint, the physical injury, and that it had no relation at all to the genetic hazard involved. In your opinion, would the exposure of 200 roentgens be distinctly deleterious from a genetic standpoint? Or would it be a factor of damage to the genes?

Dr. LAPP. There is a question that a dosage of 200 roentgens, whole body—in this case, of course, it would be radiation of the gonads that would be significant, but because of the nature of fallout, it would irradiate the person uniformly, the dosage to the feet, somewhat more than the gonads. But an exact estimate or even a rough estimate of the genetic hazard from a nuclear war is not easy to make.

Not only are there great uncertainties in this, but you have the very real problem that we would have to work on this in terms of the doubling dose of radiation. That is, there are a certain number of mutations due to natural radioactivity, what percentage this is we are not sure. The data are hard to come by. It is generally believed that of the order of 30 roentgens will double the natural genetic mutations that occur in humans.

As you know, about 3 percent of all human births carry some congenital malformation, unfortunately. What percentage of that 3 percent is due to natural radioactivity is not understood. It is often assumed that it is 10 percent. If you want to make your estimates of the number of genetic casualties that occur, you then have to make another assumption, the relation between genetic mutation and radia-

tion. You then have to distribute this in the first generation and second, and on through many generations.

I would prefer not to make a quantitative evaluation or even to characterize this. I am no geneticist, and I believe there has been adequate testimony on this before the Joint Committee.

It is certainly a terrible thing to visit the damage of one war upon the next and succeeding generations. But it is a terrible thing to have——

Mr. HOLIFIELD. But the exposure of 200 roentgens in a short period of time would have to be considered in relation to the average exposure of 7 roentgens over a 70-year lifetime from natural radioactivity; and so if, as we have been told, there is gene damage in the exposure of 7 roentgens over a 70-year lifetime, certainly there would be a tremendously great mathematical increase in genetic damage if you received 200 roentgens in a short period of an hour or a day or more.

Dr. LAPP. I would like to point out that there is definitely going to be an increase. As to how much the increase is, I am unwilling to make an estimate since it is outside my field of competence.

Mr. HOLIFIELD. Well, I am glad to hear you say that, because most of the figures which have been given by certain scientists and accepted by the general public as being accurate figures based on proven laboratory experiments are not such; they are based upon assumption, as you point out, about the relative degree of genetic damage in the natural mutations which occur—and occur from many other causes besides the natural background radioactivity.

Dr. LAPP. There are a number of things that are pertinent here, if I may interject this. One is that in the Kerala region of India, some 100,000 natives live in various degrees of shelter but are exposed to the radiation from the monazite sand.

Preliminary measurements have been made and been reported by the U.N. on the exposures to which these people are subject and it turns out that these people are subject to on the order of 10 roentgens per year, 100 times what we are here in the United States.

Now, there is a population of around 100,000 and yet there is no evidence as yet, one way or the other, as to what the genetic effect of this radiation, of this extra radiation, is upon them.

One of the problems is that you have to get accurate scientific data to come up with an answer and to get accurate scientific data in this region of India is very difficult.

Mr. ROBACK. You mean overpopulation is still an acute problem there. Is that what you meant?

Dr. LAPP. I don't know about overpopulation but the average age of the person there I understand is 29 years.

Mr. HOLIFIELD. You don't mean by that that this is necessarily attributable to the excess radiation in the monazite sands?

Dr. LAPP. I wish in no way to make that connection.

Mr. HOLIFIELD. I am sure that you do not.

Dr. LAPP. I would say that some people have made relationships between radiation and altitude and radiation and living in certain buildings, without examining the differences that exist. For example, if you said that people in Denver have more or less radiation disease as a result of the altitude at which they live, you would be very unscientific

because of the fact that at Denver there is not only more radiation, but there is quite a difference in the total environment.

Mr. HOLIFIELD. But some softheaded people are not satisfied with taking scientific truth, they want to bend it to their prejudices.

Dr. LAPP. The prejudices, Mr. Chairman, work both ways here.

Mr. HOLIFIELD. Yes.

Dr. LAPP. I think the rule for any scientist on this should be that he should testify as to what he knows.

Mr. HOLIFIELD. As to facts.

Dr. LAPP. As to facts. That is what I am trying to do here. I would introduce one more bit of evidence and that is the recent report of the AEC put out in January of this year gave a preliminary study of the incidence of congenital malformations and the geographic distribution in the United States. This report, I have forgotten—I think Grahn is the author. I can make this available to the committee—I do not have it here—showed that the problem is statistical and that there is a suggestion that there is a correlation between additional radiation and congenital malformation in the United States.

(The document referred to was subsequently identified as follows:)

"Relationships Between the Geologic Environment and Mortality From Congenital Malformation," J. Kratchman and D. Grahn, August 1959, issued January 1960. Atomic Energy Commission report TID–8204.

The data are not hard, it is a suggestion. This tends to reinforce the data of Dr. Gentry in New York State. But as yet you are dealing with a statistical problem and these things are very difficult to deal with. I would like to leave the messy field of biostatistics here and get into something which involves physical science and that is a straightforward calculation of weapon effects.

Mr. HOLIFIELD. Will you read this to us rather than summarize it so that we can study it along with you, this section.

Dr. LAPP. If you wish I would be glad to, and I would like to make use of a very rough chart.

Mr. HOLIFIELD. We haven't had a chance to see this before, as you know.

Dr. LAPP. Yes. I only saw it last night. Any discussion of the fallout problem as related to attacks on ICBM bases inevitably involves consideration of the policy of nuclear deterrence. It is basic to a policy of nuclear deterrence as applied to the United States that the retaliatory systems be capable of surviving enemy attack and responding on such a scale that the aggressor would be deterred from his initial attack because of the unacceptable damage that would be incurred.

COMPARISON OF NAVY AND AIR FORCE DETERRENT VIEWS

That is a statement of the principle of deterrence and I will try to develop by means of a graph that there are two views of deterrences, one view commonly used by the Navy and one view commonly used by the Air Force and it is important to stress the fact that there is a difference here and this difference profoundly affects national policy.

Also it profoundly affects the kind of retaliatory force you make. The U.S. Air Force has adopted the policy of putting its Atlas and Titan bases in toughened or hardened configurations (except for some initial Atlas "soft" installations) capable, in the hard form, of withstanding an overpressure of 100 pounds per square inch (p.s.i.).

I believe that it is important to examine some aspects of megaton-class weapon effects in order to assess the probable number of missiles required for a knockout of a hardened launcher and thus estimate the degree of fallout hazard associated with nuclear attack.

The explosion of a 10-megaton weapon, 10 million tons of TNT equivalent, produces the blast overpressures as follows:

Overpressure, 200 p.s.i. Distance, 1 mile.

In other words, the blast pressure of 200 pounds per square inch would extend out to 1 mile from detonation. This number applies to a surface blast. One hundred pounds per square inch, 1.4 miles.

Overpressure, 50. Distance, 1.9 miles.

Overpressure, 20. Distance, 2.8 miles.

Overpressure, 10. Distance, 4.1 miles.

Overpressure, 5. Distance, 6.1 miles.

Overpressure, 2.5. Distance, 9.7 miles.

Mr. HOLIFIELD. To help the layman's understanding, how many pounds per square inch pressure would knock down the average framehouse.

Dr. LAPP. The average framehouse would succumb to about 2.5 pounds per square inch.

Mr. HOLIFIELD. So then in interpreting this, a 10-megaton weapon would destroy framehouses in a circle the radius of which would be 9.7 miles?

Dr. LAPP. Yes. This variation——

Mr. HOLIFIELD. Do you have the figures on brick houses?

Dr. LAPP. That depends somewhat on the construction. They would be somewhat more resistant, but the fact is not too much, because the blast actually moves the wall and it cracks and becomes a casualty. The experience in Hiroshima, although there weren't too many brick walls, shows us that. A reinforced concrete wall can stand up much better, of course.

Mr. HOLIFIELD. But the brick wall, a great deal of the strength is perpendicular.

Dr. LAPP. Yes.

Mr. HOLIFIELD. If it gets a blast wave on the side of the wall, in fact sometimes the brick will fall before the frame, because a frame will give and come back.

Dr. LAPP. If you have resilience, you can ride out the punch. If you can't ride it out, you are in trouble.

Now, these numbers here are very important because they determine what the vulnerability of the case would be. These numbers, I am sure, are carefully studied by the Air Force. It is assumed that the warhead is burst at the earth's surface in order to maximize the knockout probability.

The reason for making that statement is that you want to communicate the maximum amount of earth shock, and not depend upon airblast. A 10-megaton weapon is assumed as a reasonable estimate of enemy capability for the 1963 time period. Improved thrust for ICBM's may raise this value but the results, as will be seen, show that a 10-megaton weapon or even 5 megatons is very impressive.

ESTIMATE OF SOVIET ROCKET THRUST

Mr. HOLIFIELD. Would it be appropriate at this time for you, Dr. Lapp, to give us a little additional information—if you don't have it later in your statement—as to the relationship between the Russian thrust capability and the type of warhead they can carry, and our own thrust capability in ICBM's, in terms of megatonnage in our warheads?

Dr. LAPP. I would be glad to give you my estimates. I qualify them as being my estimates. These bear no mark of approval from anybody but myself.

Mr. HOLIFIELD. I am sure that they are based on sound mathematical formulas, though.

Dr. LAPP. The Russians have not told us their thrust directly, but they have told us theirs by virtue of performance. There are certain rules you can apply to trajectories into which they launch various objects. For example, they have shown us that they put 3,000 pounds into a low satellite orbit. There is a relationship between the amount of weight you can throw into a low orbit and the amount that you can throw at intercontinental ballistic range. This relationship is roughly a factor of 3. In other words, you multiply this by 3. So, if you can throw 3,000 pounds in orbit, then you can throw, I would say, close to 10,000 pounds at ICBM range.

Now, 10,000 pounds at ICBM range—this, by the way, checks roughly with the estimates that have been made of Russian thrust, which is about three-quarters of a million pounds. If you take the ratio of payload to total load, this checks out, roughly.

Mr. HOLIFIELD. All right. Now, let us make the same calculation with the heaviest object that we have put in orbit.

Dr. LAPP. If we will put something really heavy in orbit I will be able to do this a little better. I can work on this from a different way.

Mr. HOLIFIELD. All right.

Dr. LAPP. My estimate for the U.S. capability would be much poorer than the Russian capability.

RATIO OF THRUST AND WARHEAD

Mr. HOLIFIELD. I understand, but the people are entitled to know the facts, because a lot of people have been told that this was just a gadget to put a 3,000-pound object into orbit, and that it had no relationship to military capabilities, and this is why I would like for you to make the comparison and relate it to military capability.

Dr. LAPP. Well, in the case of the U.S. thrust capability on Atlas, it has been stated by a number of witnesses—I am using data from the last Senate appropriations hearings—and they use a value of 360,000 pounds' thrust.

Offhand, if you look at this from the standpoint of arithmetic, if you have 360,000 pounds' thrust for a U.S. missile, and then you have twice that for the Russian missile, it might sound that they can only project twice as much as we can, or, vice versa, we could only project half as much as the Russians.

It turns out that this doesn't quite work that way. Much depends in the particular case of the U.S. missiles on what that second stage is like, what your specific impulse of your fuel is, what the staging is; it is a rather technical problem and it does not lend itself to simple reduction.

I would say, if I had to give you a number based on a number of convergent lines of evidence, that the U.S. warhead would be half that of the Russian. I again qualify; that is my own estimate.

Mr. HOLIFIELD. You are speaking now half in weight?

Dr. LAPP. Half in weight at the present time.

Mr. HOLIFIELD. Assuming the same degree of efficiency in the Soviet warhead and the U.S. warhead, it would be also half the megatonnage?

Dr. LAPP. I think approximately, but there, again, there are changes.

Mr. HOLIFIELD. If there is a difference, if the U.S. warhead is more efficient per pound than the Russian warhead, of course, this would not hold true?

Dr. LAPP. I think that the U.S. missiles have good growth potential, so that I believe that you will be able to get Atlas——

Mr. HOLIFIELD. In thrust, you are talking about?

Dr. LAPP. Yes, and in terms of the warheads designed for them. I believe we have a potential for getting a high payload out of Atlas; out of Titan, especially.

Mr. ROBACK. Are you assuming that the Russians have now the benefits of what we used to call, or has been called, the thermonuclear breakthrough,

Dr. LAPP. Yes.

Mr. ROBACK. So that they are no longer saddled with the old heavy warhead burden? Why do you assume that, by the way?

Dr. LAPP. I assume that, because of the tests they conducted in 1958. The data they couldn't keep secret came down in fallout, all around the world.

Mr. HOLIFIELD. Analysis of their fallout shows they have the hydrogen weapon the same as we have?

Dr. LAPP. Yes. This was introduced into evidence in the 1959 series of hearings, where the yield of various weapons was introduced, and once you have the yield that they have put up you can be pretty sure they have broken through. Whether or not they have developed clean weapons, I don't know.

Mr. ROBACK. The reason I ask is that many people have speculated that the reason the Russians were able to project big payloads is that they did not wait in their ICBM development for the nuclear breakthrough; they had to build their bird around a big bomb, and therefore they could carry big payloads.

Dr. LAPP. I believe this is true. I believe one of the contributing factors to what is known as the missile lag, one of the contributing factors was the fact that we didn't foresee the kind of compact warhead that could be made and, therefore, there was no high priority attached to the ICBM until September of 1954, I believe it was. This follows the Von Neumann committee recommendation of February 1954. It is a very real factor.

Mr. HOLIFIELD. But once having developed the superior thrust and then having developed the hydrogen warhead, the mating of it became a matter of advantage to the Russians over the comparatively smaller thrust of the Americans?

Dr. LAPP. In response, I can conceive of no general who would say he didn't want a bigger warhead.

Mr. HOLIFIELD. And a larger thrust?

Dr. LAPP. Yes. The two would go hand in hand.

Mr. HOLIFIELD. To carry a heavier warhead?

PHYSICAL EFFECTS OF 10-MEGATON WEAPON

Dr. LAPP. I am now going to give a few physical effects. A 10-megaton-weapon surface burst would produce a crater 250 feet in depth and about one-half mile in diameter. In the plastic zone of deformation, a very severe earth shock would extend to about 2.5 times this distance or to 0.6 mile. The fireball radius would be 1.35 miles.

Let us consider how many missiles of 10-megaton power an enemy would have to launch successfully, and by that I am excluding reliability. I am not trying to attribute to the Russians any degree of reliability. In order to achieve a high probability of knocking out a 100-pound-per-square-inch hardened ICBM, it is customary to use a 90-percent figure for estimating the probability of a knockout. Having fixed the warhead size, the problem is one of estimating the c.e.p.—circular probable error or the radius within which 50 percent of the missiles fall. There is an additional factor in that an ICBM is not a true-point target but has an offpoint vulnerability due to the area over which launch equipment is deployed. I have made allowance for this in the following tables, and these tables now, if I may use this chart—figure 1 attached—over here, represent in a rough way the circular probable error for 1, 2, and 3 miles, and this is the number of missiles, successfully launched, required to give a 90-percent probability of knocking out a target hardened to 100 pounds per square inch. This is the 10-megaton value I am assuming will be a capability for the Russians, and you will note that at 3 miles, if you have a circular probable error of 3 miles, it takes 14 missiles to knock it out. Two miles will take six, and 1 mile will take 1½ which, of course, would be two.

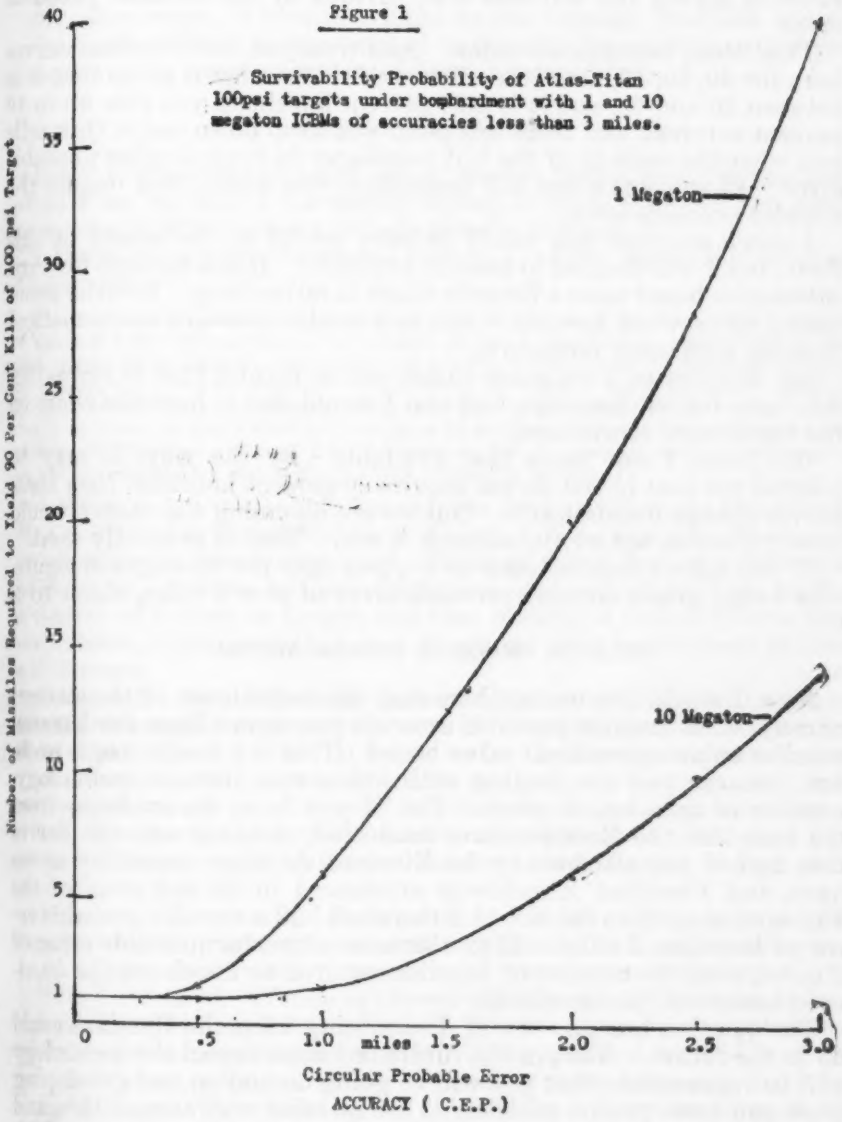
COMPARISON OF NAVY AND AIR FORCE DETERRENT VIEWS

Now, I could concentrate on this, and I want to come back to this point because these two curves illustrate the difference between the Navy and the Air Force, and there is a very real difference here in deterrence.

Let me spell this out a little. On this curve it will be noted how sharply the curve drops as the circular probable error shrinks. Now, it is interesting to compare numbers quoted by, for example, Gen. Thomas White, who in his last testimony before the Senate Appropriations Committee, and I have referenced it here, referred to a 90-percent knockout probability, and said if you harden the base to 100 pounds per square inch it takes 14 or more. I just located another reference in which the number 13 is used. General White did not

Figure 1

Survivability Probability of Atlas-Titan 100psi targets under bombardment with 1 and 10 megaton ICBMs of accuracies less than 3 miles.



specify the warhead that was involved. Therefore, in order to estimate, when you do not know what size warhead he used, I have used a family of curves. I did not put this on the blackboard because it is too difficult, in which one plots the probability of survival versus the radius of the kill parameter which is the kill distance, which in effect is saying the warhead size, divided by the circular probable error.

This, then, becomes an index. And then you have various curves here for 40, 20, 10, 5, to 1 missiles, so if the number is given that it is between 20 and 30, and it is a 90-percent knockout, you ride up to 10 percent survival, and from this point you drop down and it then tells you what the ratio is of the kill parameter to your circular probable error. If you know the kill parameter, you would then deduce the circular probable error.

I don't see that this would be very useful in the record in this form, but I will be glad to make it available. It is a straightforward calculation based upon a formula which is rather long. It is the probability-of-survival formula which is a straightforward mathematical formula with many terms in it.

Mr. HOLIFIELD. I am going to ask you to furnish that in reproducible form for our hearings, and also I would like to have the chart on the blackboard reproduced.

Dr. LAPP. I can make that available. By the way, it may be pointed out that if you do not require 90-percent knockout then these curves change dramatically. But we are assuming the enemy would have 9 chances out of 10 to knock it out. That is generally used.

If you take a number such as 14, you take the 10-megaton figure, this would give a circular probable error of over 3 miles, closer to 4.

ESTIMATE OF SOVIET MISSILE ACCURACY

Now, I would like to state here that this is the heart of the matter; namely, what circular probable error do you expect from the Russian missiles on an operational salvo basis? This is a really tough problem, because you are dealing with unknowns, Russian technology, number of missiles, et cetera. But if you have the evidence from the tests that the Russians have conducted, certainly one can derive this, and if you attribute to the Russians the same capability as we have, and President Eisenhower announced in his last state of the Union message that the last 14 Atlas shots had a circular probable error of less than 2 miles. If you assume a circular probable error of 2 miles, then the number of missiles required to knock out the hardened base would be six missiles.

The question becomes one of determining what the Russians could do in the future. Now, in the future one must expect the technology will be remorseless; that you will be going on and on and developing more and more precise missiles. I see no other way around this, and I believe that the development of precision ICBM's is an event which compares with the development of the original A-bomb in terms of its technological significance. This is something that very few people envisaged, even as little as 4 years ago or 5.

Mr. ROBACK. Would you say that the precision variable is much more important than the comparative numbers of missiles, which has been highlighted in the national defense debate.

Dr. LAPP. There are many things that are important in the national defense debate, because the circular probable error means nothing unless you specify the target. But it certainly, to my way of thinking, if we want to go into the missile-gap business, is more important to discuss the problem of survivability of some of these things, not just the number of missiles you will have.

Mr. HOLIFIELD. Which is related to the circular probable error?

Dr. LAPP. Which is here related to the circular probable error for this particular weapons system of fixed, hardened bases.

OPERATIONAL ACCURACY

Now, I would like to point out—I am not trying to argue one way or another on this; I am merely trying to point out that you must expect the ICBM accuracy on both sides to increase.

(The following item is quoted from p. 11 of the April, 1960 issue of Astronautics:)

> The day of the hardened-site, underground missile may be over before it begins if missile accuracy continues to improve at the current rate. According to Lt. Gen. Bernard Schriever, commander of ARDC, when ICBM accuracy gets down to 1 mile, the 100-p.s.i.-protected missile will be "pretty much finished," because an enemy will no longer need to build 5 or 10 attack missiles of his own to knock out 1 of ours—a much smaller number will suffice. General Schriever does not believe Russia has attained 1-mile accuracy, but he sees no technical obstacles to its attainment by either the United States or Russia.

I think it is a reasonable assumption that as you go to the future, that the circular probable error will drop, not only on a test basis, but on a simulated operational basis. We must admit there is a difference between going down to Cape Canaveral and warming things up for a matter of 2 days, or longer, and then pressing a button after a long countdown, and responding on a 12-minute alert basis; there is quite a difference.

So one can say that at the present time the operational accuracy, circular probable error, would not be 2 miles, just because of the time requirements for us. It might be for the Russians, if they decide that at some given point in time they are going to be ready, and they warm everything up, one could attribute to them a high accuracy.

Mr. HOLIFIELD. And this would be the element of advantage in a surprise attack, would be the preliminary time to line up and get their countdowns in order?

Dr. LAFF. Very much. Based on this, I believe that it is important to allow for improvements in missile guidance. I think you are going to have to look forward to operational circular probable errors of 1 mile beyond 1963. If this is correct—and certainly it ought to be a subject for profound discussion—if this is correct, that operational circular probable errors of 1 mile will be attained in 1963, and the period beyond, when we will be depending upon Atlas and Titan because General White has testified this will be a deterrent through the 1960's, if this is true, then these ICBM bases are not as secure as has been often stated.

I believe this is very important because we have to consider a survivable deterrent, it is what you have after the enemy attacks you that counts.

I am going to come back to this point because I want to bring up the fact that when the total Atlas-Titan complex is finished, there will be about 250 of these ICBM's, each one of which would be in a target and for the enemy to knock out 250 of those, even if he assigns as few as 3 missiles per target, which would be 750, and allowing for reliability, that would figure out about a thousand missiles in the first salvo. He has to get those missiles in the first salvo and perhaps even advance the time scale as far as possible because of advance warning.

SATELLITE WARNING SYSTEMS

If we got the warning that the missiles were on the way, and we really had operational readiness, we could get our missiles out of the ground before the bombs hit. These things are not at all—they may sound kind of weird—but they are not at all, when one considers the fact that some pretty weird surveillance systems are going into effect, namely, the use of satellites. I am referring to the Midas, and the other systems which are currently underway in the Defense Department.

Mr. ROBACK. You don't want to put it just like that, do you? You said "going into effect."

Dr. LAPP. I am sorry—are you implying that this——

Mr. ROBACK. In connection with Midas and several others, you said "going into effect." You don't want to invite an interpretation that there is an operational system of that sort?

Dr. LAPP. By no means, but the research and development is certainly proceeding on these. I think the potential is there. I think there is—in this area—there is a true value for military applications of satellites.

Mr. HOLIFIELD. I think you had better clarify that for the record, what you mean by the Midas.

Dr. LAPP. Well, if, for example, we have the Midas orbital device, and a number of them which are scanning the Soviet Union, being sensitive to the takeoff flame of the Russian ICBM, and we get intelligence as to the attack coming, it takes them something like 25 minutes to come from Soviet bases to the United States. If we could get that warning very soon, we could then order our ICBM's out of their holes. Now, that is certainly a decision which compresses time, and you were discussing this morning the awful decision that the President would have to make to unleash these missiles.

Mr. ROBACK. Get them out of the hole; do you mean in a ready position, or shooting?

Dr. LAPP. Shooting. It would be nip and tuck. Unfortunately, that is the nature of the future.

Mr. HOLIFIELD. You are not stating for the record that you think we have 25 minutes readiness time for any hydrogen missile at this time?

Dr. LAPP. I am not. I am looking forward to a galloping technology which beyond 1963——

Mr. HOLIFIELD. Based mostly on the development of solid propellants?

Dr. LAPP. Solid propellants will certainly be important. Clearly, if we go into future time scales I think your Atlas and Titan will probably phase out for your Minuteman, if in fact this does fulfill the military requirement, a point I would like to come back to.

CONTINUITY OF GOVERNMENT

Mrs. GRIFFITHS. May I ask a question?

Mr. HOLIFIELD. Sure. That is why you are here. You go ahead and let us find out what you think about it.

Mrs. GRIFFITHS. I would like to ask you if you are saying that under the present circumstances of civil defense every man is going to have to protect himself, and with such a short time available to retaliate, every man with a missile is going to have to fight his own war?

Dr. LAPP. I am saying that because I do not know the conditions under which the President has lined up the continuity of command. All I know is that that continuity of command worries me a great deal.

Mrs. GRIFFITHS. It would have to be instantaneous, practically? I mean, he can't be on the golf course and give the command.

We will not even bring that in. But the man would have to be right there.

Dr. LAPP. I have heard that they have a hot line on the golf course. But on the golf course a person is awake. If, for example, you were awakened at 2:30 in the morning, and now I am not giving my own words, I am giving the words of, I believe it was, General Power when he was testifying before the Senate. He put very clearly the dilemma of a commander who is going to unleash his missiles: If at 2:30 in the morning on the other end of the line somebody says we have just spotted 100 ICBM's, and they are going to impact in the United States in 20 minutes, and it has taken them, let's say, time to get the General awake, and they get another person on the phone, it certainly is going to be a very critical decision because he can't call these back as he could bombers.

And I do not know whether or not that general would have the authority to press the button. It is the President who is supposed to have that authority. If you are going to have to get the President and the general on the party line at 2:30 in the morning, at various places in this country, I think it is a rather awkward situation.

Mr. HOLIFIELD. We are going to have to consult our allies, too, because this involves our allies in NATO.

Dr. LAPP. We can laugh about this now, but I am afraid it is a nightmare in the future.

Mrs. GRIFFITHS. I insist every man with a missile is going to be fighting his own war.

ACCIDENTAL WAR

Dr. LAPP. I would like to introduce into the record, if you wish, the fact that Ohio State University has a study going on of the probabilities of accidental war. Now, accidental is not really the best word for it; it is the "I didn't mean it" war. They have broken their study down—a 5 months' study to be completed in June—into six different categories of accidents, one of which is just a systems accident; somebody makes a mistake. I am pretty sure that one can reduce that to a very small probability, not a zero probability——

Mrs. GRIFFITHS. But some probability.

Dr. LAPP. If you integrate something over a long enough period of time, something improbable may happen. But you have lots of acci-

dents possible; things that are unattended—completely instrumental—become rough. You have the possibility of irrationality in the—I do not wish to go off too much on a tangent here, but I will make sure that a copy of this study is forwarded to the committee.

Mr. ROBACK. On this point, Dr. Lapp, isn't it the case that most people introduce either explicitly or implicitly a theory of accidental warfare to convey the threat posed by both nations having all these nuclear capabilities? The mere fact of possession of such weapons leads to the assumption that war is more likely.

How could that be unless one introduces the theory of accidental warfare? Alternatively, one would have to assume that nations will use weapons merely because they have them.

Dr. LAPP. There are other things involved. For example, you might have what is called catalytic war. A country X might decide it was to its advantage to have country Y and country Z fight a war. This would be called catalytic war. They would induce a war between two other countries.

Then you have a thing which is not accidental, a limited war could start, and simply become uncontrollable.

My own opinion is that this is the most probable way in which general war would break out if it did, not as a bolt from the blue. If at some time in the future our country has a certain retalitory capacity, and the Russians have a certain offensive capacity, and if this for some reason or other should not be sufficient to the Russians, I do not believe it follows as day follows night that they will strike us by any means.

Mr. ROBACK. Does the mere fact that you accumulate weapons on each side make the balance more or less stable? I personally believe a good case can be made that you increase the stability rather than the instability.

Dr. LAPP. If there were only two countries involved, you would have a certain degree of saturation set in. But in view of the various weapons species that would develop which go down to smaller and smaller sizes, and make it more attractive to flight nuclear war, I believe this leads to the possibility of general war. This is not confined to two countries.

When you consider the growth of nuclear powers to the fifth country, which might be China, then certainly this would lead to very awkward circumstances.

I will merely mention that there are available from the congressional testimony the names and locations of the Strategic Air Command bases in the United States where these missiles are located.

I now come back to the fact that an enemy who is intent on knocking out 250 targets, assuming they could be knocked out with a 90 percent probability with 3 missiles per target, could theoretically launch 1,000 missiles and take out 90 percent of these 250 bases.

MISSILE COSTS

Now, that might be thought of in terms not just of missiles per target but in terms of actual cost. The cost per missile is perhaps $25 million—I know that the committee has heard some testimony on the cost of missiles and I was a little surprised to hear the low cost cited, because I think we have to include program cost, total program cost,

divided by the projected number of missiles that will be made. Divide those two and I think you get a realistic cost per missile.

For example, I think there has been something like a billion and a half dollars go into development of ICBM's. That is, I believe, under research and development. If you amortize that over 400 missiles you have over $4 million per missile, research and development cost. I don't think that appears in some calculations.

Then there are all sorts of side numbers that go in, including the yearly operations cost. I recall an article in Fortune magazine of November 1959, which placed the cost of ICBM, Atlas, or Titan, as $35 million for each combat missile in place. That was derived on the basis of an aggregate total of $7 billion for research and development, missiles and bases, production and everything, hardening, and a total of 20 squadrons.

Now, I think there are going to be more than 20 squadrons and there are going to be more than just that number of Atlases because the National Space Agency is buying Atlases, so that there will be more than just that number. So that the cost of $35 million may be high. On the other hand, you will have to add up the yearly operations cost for each missile base, and you will have to tie in, I suppose, the hidden cost of the base, itself, the SAC base.

Examination of the fiscal year 1960 House hearings of the Appropriations Committee shows a total program cost of $10.4 billion for the Atlas-Titan programs. If this cost is distributed over a total of 270 ICBM's, the average in-hole cost is $38.5 million each.

But if you take $25 million per missile, and you have to have 1,000 of them, that would be a total cost of $25 billion. Considering the nature of the titanic struggle, that is not an excessive cost distributed over 5 years. That is very simple arithmetic. I introduce it merely to illustrate the concept of cost versus targets.

EFFECTS OF NUCLEAR ATTACK

Now, I would like to conclude by putting in some testimony on what this would mean to us, assuming we get hit. In other words, assuming deterrents do not deter, and some 30 megatons land on each ICBM target. I have made some technical assumptions which I believe are consistent with the general technology: 70 percent fission yield, 80 percent debris falling within the continental United States. This would lead to a total fallout on the United States from an attack on 250 bases of 4,200 megatons.

In part 1 I gave the radioactive hazard in terms of kiloton per square mile. Thus, we can make an evaluation of the radiation hazard.

I located this reference of the Institute for Defense Analyses, the weapons systems evaluation division, a report called the "Distribution and Effects of Fallout in Large Nuclear Weapons Campaigns." In this report there is a curve showing the relationship between attack in megatons upon the United States and the percentage of people killed by fallout within 60 days.

There are four curves here, and the curve that is pertinent is the lowest curve which is labeled "Attack on Airbases in the United States." This curve shows that for 4,200 megatons you would kill 40 percent of the people in the United States. Now, I think that probably would have to be—I think that I would ask IDA—Institute for

Defense Analyses—to supplement this by making it specific that those airbases were ICBM bases, in order to be sure of the placement of that curve.

But it is interesting to note how that curve goes. It is quite a sharp curve. And it shows, by the way, that the results in the United States are almost the same as if they uniformly distributed the bombs over the United States; i.e., random targeting.

This simplifies my testimony because I do not have to go into any specific evaluation. OCBM, I am sure, is very capable of making these evaluations. I simply present this piece of data, and go on, and I would like to add one final thing. That is with respect to the graph in figure 1. (See p. 223.)

If we take and consider a 1-megaton weapon, rather than a 10-megaton weapon, we see that the number of missiles required per target is very much greater for any circular probable error. With a 3-mile circular probable error, with a 1-megaton warhead, you would have to have 40 missiles to give a 90-percent probability of knocking out a 100-pound-per-square-inch target.

COMPARISON OF NAVY AND AIR FORCE DETERRENT VIEWS

Now, that is 40 missiles, which means, to my way of thinking, that an enemy would not attack those bases. Obviously, there is some point on this curve where the cost to an enemy is excessive. But I think the most important difference of opinion, as I judge it, between the Air Force and the Navy, by using big weapons hurled with great precision you can knock out hardened targets. By using small weapons, only 1 million tons of TNT, which would be the growth of a Polaris missile—I am citing the data of Secretary Gates, who gave the value of 50 times the power of the Hiroshima bomb as the Polaris warhead, and depending on what you take for Hiroshima—whether or not you take the actual value of about 15 kilotons or the generally accepted value of 20 kilotons, this turns out to be three-quarters of a million or 1 million tons. This, to my way of thinking, now, has to be interpreted in terms of the strategy of the Navy and Air Force.

NAVY VIEW OF DETERRENCE

Admiral Burke testified this morning as to the Navy viewpoint on this with respect to the Polaris missiles, and the viewpoint was that the enemy would be deterred from being aggressive if he knew that punishment was inevitable, and he said that the inevitability of this punishment would deter the Russians because they couldn't hit the Polaris and the Polaris could take all the time it wanted to respond.

Obviously, the thing that Polaris was going to hit in the Soviet Union was the cities. With a 1-megaton or less warhead, they cannot hit hardened targets, and this brings into focus now a really fundamental difference on deterrence.

AIR FORCE VIEW OF DETERENCE

Taking my data now from the last Senate appropriations hearing—testimony of Generals White and Powers—judging from their statements, I gather that they want flexibility in their deterrent. They want the ability to be able to meet a Russian challenge with initiative.

Now, the word, "initiative" is rather subtle here, but, as I interpret it—and I think I do no injustice to their testimony—if there were to be some aggression, let's say a limited affront to a country to which we had quaranteed our support, we would then be able to say to the Russians: If you do not remove your troops from that soil or if you do not stop this, we may attack you. That kind of a threat to the Soviet Union would not be believable if all we could do was to have the Polaris lob in missiles against Russian cities. These missiles lobbed against Russian cities would never stop the Soviet bombs from hitting us. So that we would be on the wrong end of the deterrent policy in this case.

It is, I believe, that difference between Navy view and Air Force view which is so significant in this discussion of deterrence, and I think that it is revealed in the published Senate testimony, although it, to my way of thinking, has never been very well explained to the public. Yet it seems to me this is basic to our whole concept of deterrence. If you are going to buy a deterrent, you had better know what you are buying.

Mr. ROBACK. On this point you are saying that the Navy has a residual kind of deterrence, not the primary function of deterrence in the sense that the Air Force has, but consider this: As is generally accepted in this country, we would not be what is known as a strike-first force. Why, then, would the Air Force be in any different position from the Navy? They would have to strike second, and there would be no point, in striking second, to strike to strike at targets that have already departed their bases. Do you know?

Dr. LAPP. Yes.

Mr. ROBACK. Therefore, if we accept the idea that we are not the aggressor and do not strike first, but strike second, and if there is no point in striking at targets that have already departed, what difference is there between that concept and the Navy residual deterrence?

Dr. LAPP. The difference is—and I believe this came out in part of General LeMay's testimony—that he wants to use a counterforce strategy. If we want to give names to these two strategies, we can use the name residual, minimum, or negative deterrent, which is what the Air Force calls the Navy deterrent.

Mr. ROBACK. Just to make it explicit for the record, you are saying, if I follow you, that, as you read the Air Force testimony, it is based upon a strike-first concept?

Dr. LAPP. I do not wish to tag the Air Force with aggressive intent in violation of the democratic precepts; it would be most unfair.

Mr. ROBACK. No, no; please don't misinterpret it. Because anybody who tries to analyze the concept of the massive retaliation must recognize that this concept contemplates the possibility of a first strike; namely, the possibility that if the Russians move in Europe or elsewhere, we could strike their heartland, and that would be a strike first in the terms of our discussion.

Dr. LAPP. The Air Force has argued publicly that it is not content with the present policy.

Mr. ROBACK. I just wanted to draw the testimony out, because, if it is worth stating, then it is worth discussing.

Dr. LAPP. I think it is worth stating and worth discussing, because this is a matter of national policy, and I think it is a matter for public discussion: I do not think it has been discussed adequately. I think this is the point Mrs. Griffiths brought out yesterday; namely, who gives the order, or what do you do, has not been discussed adequately.

I pretend to follow congressional testimony fairly well, and to read the Congressional Record, too, and I believe this is one of the few times—this week when I have heard, with this committee in session—when I have heard some of these problems discussed.

Mr. HOLIFIELD. Nobody wants to face up to them; they want to sweep them under the bed.

STRATEGY RELATED TO MISSILE HARDWARE

Dr. LAPP. I am afraid we have to face up to these problems in terms of buying hardware.

Mr. HOLIFIELD. It is easier, you know, to sweep these things under the bed than it is to discuss them, because when you start discussing them the people have an opportunity then to find out what is in store for them.

Mrs. GRIFFITHS. The Maginot line of our own time is the belief that, if we are strong enough and we can retaliate, we won't be attacked. The French seemed to think they could stop the attack. We seem to think it won't occur.

Dr. LAPP. It is basic to a policy of nuclear deterrence that strength will deter. It is basic. This is the keystone of our defense policy.

Mrs. GRIFFITHS. Our whole theory; that is right. We have no second line. If this fails, we are sunk.

Dr. LAPP. If deterrence fails——

Mrs. GRIFFITHS. We are through.

Dr. LAPP. I believe the first person to really state this was Secretary of Air Finletter back in an address to West Point in 1952, I think it was; if deterrents fail, our defense is gone.

Mrs. GRIFFITHS. Certainly, and the whole population is going to go with it; you are not even going to survive.

Dr. LAPP. Survival will certainly be very difficult. These curves show, if the attack goes high enough, survival becomes very awkward.

Mr. HOLIFIELD. No one wants to face the problem of civil defense, because it is a tremendous problem, and this committee for over 4 years has been pointing out what the problem of civil defense is in an effort to educate the American people as to the horrors of nuclear war.

We have never had any illusion, most of us, that the Pentagon and the administration would face up to the problem, because it is a big problem, and any moneys expended in civil defense might come from the budgets of the military, and this would be pretty bad, you know, because it is very necessary to harden our bases and to take evasive action with Polaris submarines to preserve our weapon capability, but to protect our people from the failure of a deterrence policy; this is a contingency which the budget does not allow.

Dr. LAPP. I think the anatomy of why we have such apathy in civil defense is complex. One obviously goes back to the fact we haven't been attacked. But there is also this galloping technology I talked

about. Every time you turn around something new happens. If you had designed an effective civil defense against the Hiroshima bomb, then the H-bomb and then fallout came along and it looked pretty hopeless.

I pity the poor planners who have to worry about these things. Maybe these weapons have reached saturation, maybe they will get no worse, but that hasn't been the history in the past. You had to face the kiloton, then the megaton, then the fallout.

You had almost an unending succession of great quantum jumps in weaponry. Then, of course, you compress the whole business by means of this rapid delivery of the weapons by ICBM's. And many people tend to still think of the past and how in World War II Germany was able to recover from the bombings it had to absorb. But they forget that these bombings occurred over a period of many, many weeks and months and they were spotted and they were able to recover and, of course, the German experience with shelters was most interesting. They did build some quite massive shelters and people did survive in them.

EFFECT OF HARDENING ON CIVIL DEFENSE

Mr. ROBACK. Can we discuss for another moment, Mr. Chairman, the civil defense implications of these targets. General LeMay's testimony was generally to the effect that there was no point in assuming that the only targets were these hardened bases; targets would be all over the country, so you couldn't put your finger on these bases as being the special magnets of megatons.

Dr. LAPP. When I heard that testimony, I was quite shocked. I had never really believed anyone thought this. The theory of deterrence holds that you must be able to knock out the retaliatory force, otherwise you will not attack.

So when this testimony was given, I was really quite shocked. I didn't know anybody thought like that, but on the other hand, I was also shocked—if I may comment—to hear that the Strategic Air Command is adopting the policy of evacuation for protecting the personnel of its bases. This I found a little bit paradoxical that they would take people from their own base and move them out some distance where they would not be in underground shelters, but would be exposed above the earth.

That policy of evacuation in time of attack, seems to me to be playing tag with fallout, which is playing tag with death. I was surprised to hear that.

Mr. ROBACK. It was in the testimony also that by concentrating on these bases, or inviting, you might say, enemy concentration on these bases, in a sense you draw off the threat from other parts of the country in some way.

Now, how does that relate to the information you presented on the IDA study about the random distribution of fallout effects?

Dr. LAPP. Well, as I say, I would like the IDA study expanded to be very specific to the matter of ICBM bases rather than airbases, because it is quite clear the Air Force has bases in almost every State.

However, a random bombing of the United States is very close to bombing the Air Force targets according to this curve. Now, I think in the list of bases I have given on page 8 of my testimony, all

of these bases are west of the Mississippi, the bases that have been announced, except there is one very curious one in New York State.

They have announced just a month and a half ago that there will be an Atlas base at Plattsburgh, N.Y. I was quite shocked when I heard that, because it seems to me this is putting a base very close to very dense population and I wonder what the site selection criterion was in this.

Mr. ROBACK. But if the fallout distribution is random, suppose a base were somewhere else and very hard, and you had to dump in more stuff to cope with hardened bases, the distribution of fallout effects being at random, what difference does it make whether you are upwind, downwind, inside, or outside?

Dr. LAPP. The difference here would be—for example, if the Air Force had located all of its targets on a line in the Rocky Mountains, right square through the Rocky Mountains, if they had SAC bases located in the Rocky Mountains so they could have had the real estate on which to put these bases, then if one draws the fallout patterns they would have been confined to the Rocky Mountain region because your intense fallout would probably go 200 to 300 miles and in extreme cases, 500 miles.

Mr. HOLIFIELD. Because of the downwind situation.

Dr. LAPP. Yes, the wind vectors are fairly well known. On that basis a bombing of such targets would confine the damage within that area of the United States. However, some of these are located in California, in Washington, then this new one in New York State. That one in New York State, it seems to me, would be——

Mr. HOLIFIELD. I think in fairness to earlier testimony, the selection criteria used by the Air Force in connection with all these bases do include consideration of relative safety for the downwind populations, whichever way the wind is.

Now, they don't say it is completely safe, but your bases that run through your middle sector are far enough west, in most instances, with thinly populated areas easterly of them.

In California there are quite thinly populated mountainous areas directly east of the bases. I am not defending their location, but in fairness to the record, I think, I would say that. I have in mind no definite population per square mile, but as I studied publicly announced bases on the map, it did appear that, comparatively speaking, the population is lighter than it would be in any location east of the Mississippi River.

Dr. LAPP. There is no question about that. I think however, with these other bases you may be gambling with the wind. The wind doesn't always go in the same direction.

Mr. HOLIFIELD. No; that is true.

Dr. LAPP. I think you are taking a risk. Unfortunately it is the population that is taking the risk.

Mrs. GRIFFITHS. And unwittingly.

Mr. HOLIFIELD. But I don't think the question that Mr. Roback asked has been quite adequately answered.

Dr. LAPP. Let me see if I can be more responsive to this.

Mr. HOLIFIELD. The point is, notwithstanding the fact that there would be a concentrated attack on these bases, would there or would

there not be as much general radioactivity nationwide as there would be if there were the same amount of megatons dropped on a random pattern?

Dr. LAPP. I am sure the casualties would be much less on the present targeting than on a random pattern, I am sure of that, because obviously east of the Mississippi you are going to get very little damage, except for the New York base, if they do not put any more east of the Mississippi River.

There are six more bases to be announced, I believe.

DETERRENCE

Mr. ROBACK. What happens when invulnerability grows, either through a sea-based or land-based mobile system, what happens to your civil defense problem? Does it grow less because your deterrent strengthens or does it grow greater because the enemy, not able to reach weapons, will reach people?

Dr. LAPP. Now, I do not think so. On the theory of deterrence, I would subscribe to the view that if the enemy cannot knock out your power to retaliate, he will not attack your population because that would be inviting mutual suicide. I would hold with that view. This is the theory of deterrence.

The more and more invulnerable your deterrent forces become, the more it will tend to stabilize deterrence.

Mr. ROBACK. Does it follow from that position that the more invulnerable your retaliatory system becomes, the less becomes the need for a civil defense program?

Dr. LAPP. I do not think that the two are related in that way. The one is a military problem, the other is a civilian problem. I would say this if you are going to live in the next decade, which is going, in my opinion, to be a period of transition, I personally am hopeful that we will eventually understand the nature of these weapons, that all nations will and that we will have a condition of arms control.

I do not, even under the most optimistic view, see the world suddenly becoming so agreeable that we can lay down our arms and say: Fine, we will trust each other. What we will have, I think, and without even probably good agreements between countries, you will have some degree of arms control during the next decade. Nobody can afford to do everything that modern technology presents to people.

So I think you are going to have arms control and I would hope that it would be good arms control under monitoring systems.

But you can't expect that this will occur overnight, it will take a long time because you cannot simply lay down your arms and place yourself on the good behavior of the enemy. You can't do that.

You have to have some reliance upon these weapons. That is the nature of things at the present time, as I see it.

ACCURACY AND DETERRENCE

Mr. ROBACK. Coming back to your analysis of the hardened bases with the Titan and the Atlas, you stated somebody's testimony or expression of opinion that the first-generation missiles would be with us for at least the decade.

Dr. LAPP. Yes.

Mr. ROBACK. And your statement about the increasing accuracy, the circular probable error of 2 miles, that wasn't based on any immediate possibilities, necessarily, but on some future date.

Dr. LAPP. That is right.

Mr. ROBACK. So you are relating, you might say, an obsolete ICBM to a contemporary achievement in accuracy. Are you justified in that?

Dr. LAPP. I believe so.

Mr. ROBACK. Of course, 5 years hence we won't throw the Atlases and Titans out of our inventory, or 7 years, for that matter, but we will also have various other kinds of missiles.

Dr. LAPP. I am addressing myself to the Atlas and Titan specifically. Obviously when you get into Minuteman which has mobility, then I think you enter into a different phase of deterrence, because at that point, you are so far up on the curve that you simply deter. In other words, you phase through from attraction to deterrence.

Mr. ROBACK. In view of the timing, the scheduling, the coming in of these different kinds of weapons—because the immediate period doesn't have any Minuteman—you have to concern yourself with the Atlas, the Titan, the hardening program. If you analyze the problems now, or if you analyze the problems 6 years from now, they have different implications.

Dr. LAPP. I think what we are saying is that all modern weapons systems are essentially obsolescent before they are produced.

Mr. ROBACK. What I mean is, it would seem unnecessarily costly and maybe invite too much fallout, let us say, if you hardened bases, but what alternative do you have at this stage of the game?

Dr. LAPP. Let me say that this is my personal view, that I think that this is a risk; it is a risk that this is the Maginot concept. I admit it is a traditional concept. Ever since the art of war was born people burrowed in the earth for protection. But we have got to realize now that in terms of a dead center hit we are talking about something that is over a mile away, it is now mile-wide bull's eye. If you now ask me to address myself to the general problem of what the mix should be in terms of our total retaliatory effort, I would like to beg off by saying that this is indeed a complex issue which cannot be treated on a few minutes' testimony. Here we must deal with probably seven or eight variables which enter into this. This is an exceedingly complex business. I envy no one who has to plan the overall program.

DIFFICULTY OF UNDERSTANDING FALLOUT PROBLEMS

Mr. HOLIFIELD. Among the new and important factors that technology has brought about has been the quantum factor of radioactivity accompanying the impact of a warhead. In the old days a cannonball would knock down the wall of a fort and it might kill a few people as a result of flying masonry or flying metal, but this factor of radioactivity is so new and it is so deadly in its effect that most of our strategy doesn't seem to take it into consideration. It seems to ignore it rather than to take it into consideration. In the case of the hardened bases, or any other target, we are applying the concept of knocking out the fort wall.

But the secondary effect of the floating radioactivity that is ignored in that concept is the thing that bothers me.

Dr. LAPP. I think that is somewhat natural that these new hazards represent such a change in one's way of thinking. There is a new dimension involved here. It takes a long time for these things to work their way into planning.

I am reminded when you were mentioning that, when we were planning the first A-bomb shot at Alamagordo, we were worried about how we could take the scientists in and measure what was going on. My section of the laboratory had the problem of designing these meters, and we had the problem of making a meter that would respond to heavy radiation. And we had never made a meter like this before, and we had to make it very fast. But we realized that where that bomb went off there would be a lot of radioactivity. At that time we knew there would be radioactivity on the ground, but the word "fallout" wasn't used. There was fallout in that very first shot, but it didn't come down there, it went over 10 miles or so and landed on the backs of cattle.

But here we were scientists working quantitatively with this stuff, and we still didn't become aware of this. In fact, fallout didn't become recognized as a hazard until 1954.

There was plenty of time before that to recognize the dimension of this thing, but this is the nature of things. It is hard even for scientists to understand some of these things.

NEED FOR WEAPON MIX

Mr. ROBACK. Are you making any recommendations in your testimony, or as a result of your testimony, as to how the retaliatory power could be based, let us say, outside the United States, mobile? Is there anything that we can draw from your testimony in that line?

Dr. LAPP. I have attempted to confine my testimony specifically to three points. If you ask me to testify as to what I would do if I were the Chairman of the Joint Chiefs of Staff, and had complete unification—these are assumptions—if you would ask me what I would do under these conditions, I would prefer to see the retaliatory power of the United States divorced from the continental United States. I would prefer that this retaliatory power be based on the ocean, and I would also prefer that in the interim before Polaris is a weapon system that we have surface ships equipped with higher yield warheads.

Mr. ROBACK. As it now stands, it is a residual deterrent and you are not recommending that we limit ourselves to a residual kind of deterrent?

Dr. LAPP. My own feeling on this score is that you have to have a diversified deterrent because you never know when somebody is going to turn up—you can be confident today that the submarine may be able to be quite nondetectable, but I am sure that if this committee had examined some admirals before World War II as to what their capability was with respect to the German navy, and German submarines, I think you would have gotten testimony that might not have been borne out by the events of World War II, when as I recall the submarine threat was one of the most terrible things we had to face.

I think it would be dangerous to pin your deterrent power to any one thing of this kind. My testimony, then, is that I prefer to move

the deterrent power away from the continental United States, where it in my opinion brings an associated hazard to the United States, to the civilian populations. I prefer to take it off the continent, and in this case it means putting it at sea.

We have the Polaris underway. I would like, as my own suggestion, to see a solid-fuel ballistic missile of higher power than Polaris put on surface ships, essentially on a crash program basis, to take up the gap during the period of weakness in deterrent power. I don't think this is impossible. Certainly the Polaris in its present form is limited by the actual locker room on the submarine. Certainly you can get a bigger boost, we have experienced with IRBM's we might even use liquid fuels on board ships. This is a technical problem, but it may be possible; for example, with storable fuels.

Mr. HOLIFIELD. Dr. Lapp, thank you very much for your testimony today. It has been very provocative, and it will help the committee, I am sure, in its deliberations on this matter.

We are concerned very much with the lack of civil defense, or the lack of defense of the population of the United States as a result of the on-rushing tide of nuclear technology in all these fields. We recognize that it is a complicated subject and our study will be helped by your testimony.

Thank you very much.

The subcommittee is adjourned.

(Whereupon, at 3:55 p.m., the subcommittee adjourned.)

(The full text of the prepared statement submitted by Dr. Lapp is as follows:)

STATEMENT OF DR. RALPH E. LAPP, NUCLEAR CONSULTANT

My testimony consists of three parts.

I. EXTERNAL RADIATION HAZARD FROM FALLOUT

I would like to introduce technical data which were first published in the article "Local Fallout Radioactivity" (Bulletin of the Atomic Scientists vol. 15, pp. 181–186, May 1959). Based upon consideration of recent theoretical investigations of fission product radioactivity and upon experimental data from the Eniwetok Proving Ground, I arrived at new estimates of the actual external or gamma radiation dose to which a person would be exposed if unprotected from fallout. I assumed a 4,000 roentgen per hour at the 1-hour reference time and deduced the following schedule of dosages with the passage of time:

Time interval	Radiation dose (roentgen)		Time interval	Radiation dose (roentgen)	
	$t^{-1.2}$ rule	New estimate		$t^{-1.2}$ rule	New estimate
1st day	4,000	4,000	4th month	240	6
2d day	1,400	950	5th month	180	4
3 to 7 days	2,080	1,320	6th month	130	2
2d week	920	535	6 to 12 months	500	9
3d week	480	285	2d year	430	2
4th week	420	140	3d year	220	1
2d month	700	220	4th year	140	1
3d month	360	100			

The data appearing in the first column correspond to $t^{-1.2}$ rule which is usually used by most civil defense people. It is the rule which is often given in the form of a 10-fold decrease in radioactivity with a 7-fold increase in time. It is most important to distinguish between dose-rate and dose. For example, if at 1 hour the dose rate was 4,000 roentgen per hour then at $7 \times 7 = 49$ hours or 2 days

approximately the rate would be 10×10 or 100 times less, i.e. 40 roentgen per hour. In 2 days×7=2 weeks it would be 4 roentgen hour. This may not seem like much compared to the 1-hour intensity but one must remember that there are 24 hours a day and 24×4 roentgen=96 roentgen. Many people overlook the fact that a 1-day dose can be very significant even though the hourly dose-rate appears small.

The values listed in the first column correspond to total doses received in the given time period. Thus according to the $t^{-1.2}$ law if you were somehow or other completely sheltered for the first week and then entered the contaminated area you would be exposed to 920 roentgen if you stayed above surface for 1 week and to an additional 480 roentgen if you lingered there for another week. Glancing down column I it will be seen that very significant dosages are involved during the first few years. In fact, everything seemed pretty hopeless if you follow the $t^{-1.2}$ law.

The $t^{-1.2}$ law, first propounded by Drs. E. P. Wigner and K. Way in 1943 was not meant to apply to long periods of time. Nor did it take into consideration a number of technical factors which tend to reduce the dose from an exposure above a uniformly contaminated plane. Recent studies at the National Bureau of Standards, the Atomic Energy Commission, and the U.S. Naval Radiological Defense Laboratory permit a more realistic evaluation of the gamma threat from fallout. I have tabulated a new estimate of this hazard in column 2.

Comparison of the data in both columns shows that the new data reduce the dose approximately two-fold in the first few weeks. Thereafter the deviation from the $t^{-1.2}$ law is more pronounced and the 6- to 12-month dose is over eight times smaller according to the new data. The long term hazard as measured beyond the first year is very much reduced. For a person who absorbed a dose of 100 roentgen in the first year of postattack living, the 20 roentgen above-surface value in the second year would not be formidable. Here we must stress that we are dealing with a wartime risk situation.

II. INTERNAL HAZARD FROM LOCAL FALLOUT

A. *Short-term hazards.*—By short term I refer to the hazards which are present during the first postattack year. During this time one has to deal with short-lived fission products and induced activities. These include iodine 131 and other radioiodine nuclides, strontium 89, barium 140, to name a few. Iodine 131 has a 8-day half life and would be a serious milk contaminant as well as a potential hazard due to direct inhalation. Iodine concentrates in the thyroid where it would pose a special hazard for infants. It is difficult to evaluate this hazard quantitatively but it would be wise to age all milk products until their contaminants were reduced by radioactive decay. It would be safe to use fresh milk if it were tested and found to be significantly free from iodine constamination. I would expect, however, that very large areas would be potential iodine-contamination regions.

Both strontium 89 (53-day half life) and barium 140 are boneseekers, meaning that once introduced into the body they seek out and deposit in the bone. Both hazards could be reduced by allowing time for natural decontamination to occur by decay.

Zinc 65 (265-day half life) is an example of an induced activity which might form a special marine hazard due to its concentration in food chains.

I do not wish to dwell upon the short-term hazard mostly because a simple countermeasure is to provide a food stockpile to carry over until this short term hazard naturally disappears.

B. *Long-term hazards.*—Strontium 90 appears to be the most significant long-term food contaminant. This hazard has been well explored by the 1957 and 1959 investigations of the Joint Committee on Atomic Energy and I shall not attempt to describe the details of strontium 90 contamination of the food chains. It is sufficient to explain that strontium resembles calcium in its chemistry and therefore will be picked up from the soil in much the same way as calcium. Strontium 90 has a long half life of 28 years. It is born in high yield in modern thermonuclear weapons. A single kiloton of fission energy (1,000 tons of TNT equivalent) produces 100 curies of strontium 90. Thus if two-thirds of the fission debris from a bomb with a fission energy of 6 megatons (6,000 kilotons) we would have 4,000 kilotons of fallout or 400,000 curies of strontium 90 in the local fallout. This would be distributed over an area of several to many thousand square miles. One would expect that the level of strontium 90 would exceed 100 curies per square mile over a wide area. The potential, if uni-

formly distributed, would be a strontium 90 contamination of 100 curies per square mile over 4,000 square miles.

The multiple impact of high-yield megaton weapons would be expected to produce overlapping fallout patterns thus increasing the strontium 90 fallout within 100 miles or so of the target. One would expect that the levels would go up to kilocurie amounts of strontium 90 per square mile, i.e., 1,000 curies per square mile.

The problem now is to convert these numbers into some estimate of the biological damage to be expected from such levels of contamination and, if possible, to decide upon a limit above which land would be denied to normal agriculture. This is not an easy, technical problem to assess because we are still in the process of trying to understand the modes of entry of strontium 90 into food chains and the variations in uptake and retention of this contaminant by humans. However, we can make an approximation by using data on fallout from tests. I shall assume that the test fallout in northern United States amounts to 100 millicuries (0.1 curie) of strontium 90 per square mile when all the fallout has descended to earth. I further assume that such contamination results in an average of 10 strontium units (s.u.) at the maximum time of the earliest sixties. We can then equate as a rough estimate 0.1 curie equals 10 strontium units so that 100 curies would result in a retention of 10,000 strontium units by the younger generation. Very intense contamination would push this estimate up to 100,000 strontium units. Ordinarily one would expect that this high value would be reduced because people draw upon the food resources of many different sections of our country. However, a severe attack could cause such disruption of transportation and commerce that some communities might be forced to localize their food areas.

There are two ways to evaluate this strontium 90 hazard in order to make the strontium unit become more understandable. First, one can use the rule that 1 strontium unit=3 millirad per year to the bone. Thus a 10,000-strontium unit value would equal 30 rad per year or 1,500 roentgen per 50-year period. Second, the problem can be cast in terms of mpc's or maximum permissible concentrations. At the last (1959) hearings of the Joint Committee on Atomic Energy, the Atomic Energy Commission used a value of 67 strontium units as the maximum permissible concentrations for a general population. Thus a value of 10,000 strontium units would be 15 times the general population maximum permissible concentrations. However, a recent report of the National Committee on Radiation Protection recommended in a tentative manner that general population levels be set in relation to the natural background which is 100 millirad per year. It also recommended that maximum permissible concentrations should take into account the effect of other radioisotopes present and not concentrate solely upon the single isotope. If one takes these two considerations into account it is possible to arrive at a maximum permissible concentration of 16 strontium units instead of 67 strontium units.

Survivors in the postattack period would have to weigh the risks of future damage from ingested and retained radioactive material in relation to their previous exposure and, of course, to their need for food. A starving person will not worry excessively about strontium 90.

As for the biological damage from strontium 90, we know from animal experiments that it can induce bone tumor and cancer. There is no body of data on humans and it is difficult to transfer the animal data. The only pertinent data with humans is in the limited experience with radium retention in the case of dial painters and people injected with radium for therapy. Based upon a comparison of radium body burdens and observed injury, it would appear that a level of 10,000 strontium units would probably be very serious but would not be catastrophic as related to the numbers of casualties and mortalities in the nuclear attack.

III. FALLOUT ASSOCIATED WITH ATTACKS ON ICBM BASES

Any discussion of the fallout problem as related to attacks on ICBM bases inevitably involves consideration of the policy of nuclear deterrence. It is basic to a policy of nuclear deterrence as applied to the United States that the retaliatory systems be capable of surviving enemy attack and responding on such a scale that the aggressor would be deterred from his initial attack because of the unacceptable damage that would be incurred.

The U.S. Air Force has adopted the policy of putting its Atlas and Titan bases in toughened or hardened configurations (except for some initial Atlas "soft"

installations) capable of withstanding an overpressure of 100 pounds per square inch (psi).

I believe that it is important to examine some aspects of megaton-class weapon effects in order to assess the probable number missiles required for a knockout of a hardened launcher and thus estimate the degree of fallout hazard associated with enemy attack.

The explosion of a 10-megaton weapon produces blast overpressures as follows:

Overpressure:	*Distance (in miles)*
200 psi	1.0
100 psi	1.4
50 psi	1.9
20 psi	2.8
10 psi	4.1
5 psi	6.1
2.5 psi	9.7

The explosion of a 10-megaton weapon produces blast overpressures as mize the knockout probability. A 10-megaton weapon is assumed as a reasonable estimate of enemy capability for the 1963 time period. Improved thrust for ICBM's may raise this value but the results, as will be seen, show that a 10-metagon weapon or even 5 metagons is very impressive.

A 10-metagon weapon surface burst would produce a crater 250 feet in depth and about one-half mile in diameter. The plastic zone of deformation would extend to about 2.5 times this distance or to 0.6 mile. The fireball radius would be 1.35 miles.

Let us consider how many missiles of 10-metagon power an enemy would have to launch successfully in order to achieve a high probability of knocking out a 100-pound-per-square-inch hardened ICBM. It is customary to use a 90-percent figure for estimating the probability of a knockout. Having fixed the warhead size, the problem is one of estimating the c.e.f. (circular probable error or the radius within which 50 percent of the missiles fall). There is an additional factor in that an ICBM is not a true point target but has an offpoint vulnerability due to the area over which launch equipment is deployed. I have made allowance for this in the following table:

Accuracy: (Circular probable error in miles)	Warhead yield	
	5 megatons	10 megatons
0.5	1	1
1.0	2	1.5
2.0	9	6
3.0	18	14

This relationship is illustrated on the graph (blackboard presentation). It will be noted how sharply the curve drops as the circular probable error shrinks. In this connection it will be interesting to compare the numbers quoted by Gen. Thomas D. White, Chief of Staff, Headquarters, USAF (testimony of May 7, 1959, before the U.S. Senate Appropriations Committee, DOD, H.R. 7454, p. 261). Referring to a 90-percent knockout probability, General White stated: "If you harden the base to 100 pounds per square inch, it takes up to 14 or more." The reference here is to number of missiles. If General White had a 10-megaton warhead in mind this would correspond to a circular probable error of 3 miles.

Gen. Curtis E. LeMay put this number "between 10 and 30 for one of hardened sites now under construction."

By looking at the table above or by studying the curve on the blackboard, it becomes clear that hardened ICBM sites are a good or a bad investment depending upon how accurate you judge the Soviet missiles to be. We have some data on Soviet ICBM accuracy under test conditions which indicate a circular probable error of 2 miles or less. This is in the years 1959–60. To be sure, this accuracy comparable to our own, as announced by the President earlier this year, is obtained with test missiles. Under operational conditions at the present time it would be difficult to achieve high reliability of launch, let alone high accuracy. But since our Atlas-Titan bases are scheduled to be completed in

1963 and to be a bulwark of our deterrent force for the 1963–70 period, it is important to allow for improvements in missile guidance. Furthermore, the aggressor has a vast advantage in being able to tune up his missiles over a longer period of time than that afforded our ICBM's on an alert. I would think, therefore, that operational circular probable errors close to 1 mile must be assumed for the period 1963 and thereafter.

If the Soviets attain a capability of knocking out Atlas-Titan sites with a commitment of less than five ICBM's per target, the survivability requirement of our ICBM deterrent will be in question. This point is best illustrated if one considers the total Atlas-Titan complex projected for the United States.

Plans announced by the United States call for the installation of 13 squadrons of Atlas missiles and 14 squadrons of Titans. Most squadrons will consist of 9 launchers and a total of 10 ICMB's. The following Atlas bases have been announced:

Vandenberg AFB, Lompoc, Calif.
Warren AFB, Cheyenne, Wyo. (3 squadrons).
Offutt AFB, Omaha, Nebr.
Fairchild AFB, Spokane, Wash.
Schilling AFB, Salina, Kans. (12 launchers).
Altus AFB, Altus, Okla. (12 launchers).
Walker AFB, Rosewell, N. Mex. (12 launchers).
Lincoln AFB, Lincoln, Nebr. (12 launchers).
Dyess AFB, Abilene, Tex. (12 launchers).
Plattsburgh AFB, Plattsburgh, N.Y.

The more recently announced Atlas bases will be toughened (25 p.s.i.) and hardened (100 p.s.i.) configurations.

Titan bases have been announced for:

Vandenberg AFB, Lompoc, Calif.
Lowry AFB, Dever, Colo. (2 squadrons).
Ellsworth AFB, Rapid City, S. Dak.
Mountain Home AFB, Mountain Home, Idaho.
Beale AFB, Marysville, Calif.
Larson AFB, Moses Lake, Wash.

With the exception of the Plattsburgh AFB all Atlas-Titan bases announced to date are west of the Mississippi. However a number of large cities are within range of local fallout. These include: Los Angeles, San Francisco, Spokane, Fort Worth, Dallas, Oklahoma City, Kansas City, Omaha, Denver.

The total Atlas-Titan complex, when completed, will represent about 250 prime targets within continental United States. The cost to an enemy intent on attacking the United States must be measured in terms of how many missiles he will have to allocate in order to achieve a level of knockout which will leave an "acceptable" residual damage capability for the U.S. retaliatory force. The word "acceptable" as used here refers to the enemy calculus of how much damage he is willing to accept.

If the aggressor calculates that an attack with 3 missiles per target would insure a successful knockout of U.S. retalilatory power, he would then have to mount an attack with approximately 1,000 missiles. This assumes that three out of four missiles are launched successfully. Furthermore, an aggressor would be hesitant about staging such a first strike in a series of waves lest our ICBM's be launched in retaliation in the interm. The cost in dollars to an enemy does not seem exorbitant. If we estimate $25 million per missile, this would be a total of $25 billion or $5 billion for 5 years.

Making the conservative assumption that an enemy allocates three missiles of 10-megaton power per ICBM target, he commits 30 megatons per target. If these weapons have a 70 percent fission yield and 80 percent of the bomb debris falls within continental United States then the total fallout on the United States from an attack on 250 ICBM targets would be $250 \times 30 \times 0.7 \times 0.8 = 4{,}200$ megatons.

We have already examined something of the dimension of the radioactive hazard in terms of the kiloton/square mile. This can be scaled up to apply to the case of 4,200 megatons. Anaylsts in the Institute for Defense Analyses ("The Distribution and Effects of Fallout in Large Nuclear-Weapon Campaigns," published in Operations Research, vol. 7, p. 226–248, 1959) have developed mathematical models for predicting civilian mortality in the United States for various levels of attack. I note that for an attack of 4,200 megatons directed at air bases the IDA analysis predicts a 40-percent mortality within 60 days after attack. The assumption is made that the population would be afforded existing protection against fallout and that no national shelter construction program was in effect.

I have given my views on the shelter program and on civil defense in previous testimony before this committee and in various publications. I will not repeat them at this time except to refer an article, "Fallout and Home Defense," Bulletin of Atomic Scientists, vol. 15, p. 187–191 (1959), and to a critique of the Rockefeller report (February 15, 1960), which appears in the April issue of the bulletin. I shall be happy to make a copy of these available to the committee.

ATTACHMENT TO STATEMENT OF DR. RALPH LAPP

[From the May 1959 issue of the Bulletin of the Atomic Scientists]

LOCAL FALLOUT RADIOACTIVITY

(By Ralph E. Lapp[1])

This article seeks to examine the behavior of fallout debris from the standpoint of the external radiation hazard presented by this local deposition of bomb-produced radioactivity. Sufficient time has now elapsed to permit a realistic appraisal of the radiation doses which may be projected for the fallout field over a period of years. Recent theoretical calculations and experimental data derived from the 1952 and 1954 fallouts from U.S. bomb tests facilitate the appraisal. In addition, there is a wealth of more quantitative data about fission product radioactivity and weapon technology which combine to make this fallout evaluation possible.

Official Government publications[2] and Atomic Energy Commission spokesmen specify the behavior of fission product radioactivity as obeying a $t^{-1.2}$ law. To quote Dr. Willard F. Libby:[3]

"In the ordinary atomic bomb, for each 20,000 tons of TNT equivalent, about 2 pounds of radioactive materials are produced. In these 2 pounds are some 90 different radioactive species, varying in natural lifetimes from fractions of a second to many years. The mixture as a whole decreases in radioactivity in such a way that for every sevenfold increase in age, the radioactivity is decreased tenfold. Thus the radioactivity by 7 hours after the explosion has decreased to one-tenth the radioactivity at one hour; at 49 hours (roughly 2 days) to one-hundredth; at 2 weeks to one-thousandth; and at 3 months to one ten-thousandth."

This is the $t^{-1.2}$ rule which is currently used by many authorities in estimating the long-term radiation dosage from fallout.

Local fallout is assumed to be a field uniformly contaminated to a level of 2 kilotons of fission products per square mile. A bomb burst producing a fission fallout of 12 megatons distributed over 6,000 square miles would produce such an average level of contamination although there would of course be regions more or less heavily contaminated depending upon the conditions at the time of the burst. The variation in the levels of fallout will be at least tenfold and even more if one considers the vagaries of micrometeorology in a large city.

CALCULATING THE ROENTGEN DOSE

Given the 2 kiloton per square mile level of contamination, the problem then resolves itself into a calculation of the radiation dose to a man in the open, assuming that the free air ionization dose is measured 3 feet above a flat, impermeable plane. A straightforward approach would be to consult the 1957 "Effects of Nuclear Weapons" publication and then to derive the dose associated with the appropriate number of megacuries of fission products. When this is done the result is that the dose rate at 1 hour after detonation is 2,500 roentgens per hour. The total or eternity dose assuming the validity of the $t^{-1.2}$ law is 12,500 roentgens.

The above calculation follows a rather crude approach; a better estimate may be had by recourse to the following procedure. Two kilotons of fission energy

[1] Ralph E. Lapp, physicist and lecturer, has written extensively for the bulletin and elsewhere on radiation and related matters. He is the author of several books, including "The Voyage of the Lucky Dragon."

[2] See, for example, tables 9.90 and 9.119 in the Defense Department-AEC publication, "The Effects of Nuclear Weapons," Washington: Government Printing Office (1957).

[3] Speech before the alumni reunion at the University of Chicago, June 3, 1955. Note that his earlier speech at the Washington Conference of Mayors (Dec. 2, 1954) is in error with regard to fallout dosage.

correspond to the complete fission of 111 grams of uranium or to 2.86×10^{26} fissions. According to the data of R. C. Bolles and N. E. Ballou [4] this number of fissions yields 3.48×10^{19} disintegrations per second or 940 megacuries. This contrasts with a figure of 600 megacuries taken from the "Effects of Nuclear Weapons." In order to convert the fission product activity into roentgen dosage we need to know the number of photons emitted per disintegration at the time of reference and the average energy per photon. The former is 1.2 photons per disintegration and the latter is 0.92 Mev per photon. It is important to emphasize that these numbers apply to fission products which are 1 hour old.

C. F. Miller and P. Loeb [5] list the statistical data which when applied to the above calculation yield a 1 hour dose rate of about 7,000 roentgen per hour. This value must be considered as a maximum figure whereas that derived from data in the "Effects of Nuclear Weapons" must be looked upon as a practical lower limit.

Local fallout consists of relatively heavy debris which is deposited near the site of detonation within 1 day. The fission yield curve is characterized by high yields in the vicinity of mass numbers 85 to 100 and 135 to 145. In the first group of mass numbers there are many primary fission products belonging to the elements bromine and krypton, while in the other group iodine and xenon head up the fission chains. Strontium 90, for example, has 33-second krypton as its birth-predecessor; cesium 137 derives from a fission chain headed up by 22-second iodine, followed by 3.9-minute xenon. Because of their volatile or gaseous ancestry in the fireball or bomb cloud a number of the high-yield fission products are formed in finely divided particles. Some of these are so small that they are not subject to gravitational settling, and in fact they remain suspended in the earth's atmosphere for many years, providing [6] that they reach the stratosphere at the proper latitude. In any event such fission products would be depleted in the local fallout. It is difficult to allow for this depletion since it depends upon the magnitude and mode of the detonation as well as upon local meteorology.

ADDITIONAL RADIOACTIVITY

Little attention has been given to the hazards presented by radioactive products produced in nonfission reactions in the bomb itself, or in the local environment. In the case of the bomb material there is the hazard formed by the transuranic elements. For example, the irradiation of uranium 238 with low Mev neutrons forms neptunium 239, a 2.3-day radio element which W. J. Heiman [7] estimates might constitute 50 percent of the residual activity a few days after a bomb detonation. The growth of Np^{239} in fallout is such that at 1 hour its activity would account for 0.5 percent of the total gamma rays; at 1 day this would rise to 23 percent, reaching a maximum of 50 percent at 4 days. Thereafter it would fall to 40 percent at 1 week, to 12 percent at 2 weeks and to less than 1 percent by 1 month. The radiation due to neptunium is by no means insignificant although it does turn out to be less than the dosage from fission products. This will become clear when we examine the rate of decay of the fission products.

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[4] "Calculated Activity and Abundance of U^{235} Fission Products," USNRDL–456 (August 1956).

[5] "Ionization Rate and Photon Pulse Decay of Fission Products From the Slow-Neutron Fission of U^{235}," USNRDL–247 (August 1958).

[6] See E. A. Martell, "Atmospheric Circulation and Deposition of Strontium 90 Debris," Air Force Cambridge Research Center paper (July 1958). See also W. F. Libby, "Radioactive Fallout," speech of Mar. 13, 1959.

[7] "Variation of Gamma Radiation Rates for Different Elements Following an Underwater Nuclear Detonation," J. Colloid. Science, 13 (1958), p. 329.

At higher neutron energies, such as certain types of thermonuclear weapons produce, natural uranium undergoes an (n,2n) reaction which competes with fast fission in U^{238}. The data of R. J. Howerton [8] show that U^{238} has a fission cross-section of 0.6 barns from 2 to 6 Mev, thereafter climbing to a plateau value of 1 barn for neutrons up to 14 Mev. At 6.6 Mev there is a threshold for the (n,2n) reaction and the reaction has a cross-section of 1.4 barns in the range of 10 Mev. The ready identification of U^{237} in fallout points to fast fission of U^{238} as a main energy source in high-yield megaton-class weapons.

Nuclear weapons necessarily contain significant amounts of elements (stainless steel, for example) which may add to the bomb's radioactivity. This induced activity is probably small although certain long-lived emitters such as cobalt 60 may be produced in significant amounts if small amounts of nickel and cobalt are present. P. O. Strom [9] and his associates have observed the presence of cobalt isotopes in local fallout from the Redwing series of tests in 1956. Presumably this radiocobalt originated in the bomb environment. The amounts of cobalt in ocean water are too small to account for the observed activity. It is interesting to note that the locally deposited cobalt 60 contributed largely to the 1- to 10-year activity in the Redwing sample.

Weapons burst close to the ground will produce a variety of induced activities. The hazard will depend upon the weapon yield, the neutron spectrum, the chemical composition of the substratum, and the depth of the burst. A harbor burst, for example, would induce the 14.8-hour sodium 24 activity, which involves very energetic gamma radiation. There is a considerable range of induced activities possible, but it is futile to attempt any specific calculations since they would depend so strongly upon the factors enumerated above. In general it would be expected that they would add significantly to the fission product radioactivity but would not exceed it in radiation dosage.

Comparison of the role of fission product versus induced activity naturally depends upon the percentage contribution of fission to the total yield of the bomb. The foregoing has assumed a thermonuclear weapon in which the ratio of fission to fusion is 2:1. Weapons with a ratio of 1:10 may be thought of as relatively "clean" but this is subject to qualification, depending upon the operational conditions under which the bomb is burst. Even a 100 percent intestinally clean weapon (as defined by a test in empty space) becomes significantly dirty if the material close to the bomb is irradiated with the bomb's neutrons. This shows the fallacy of the clean bomb concept because for many military applications the detonation has to be so close to the ground that the neutron-induced activities will pose a real hazard to friend and foe alike.

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[8] "Reaction Cross-Sections of U^{238} in the Low Mev Range," UCRL–5323 (Aug. 15, 1958).
[9] "Long-Lived Cobalt Isotopes Observed in Fallout," Science, 128 (Aug. 22, 1958), p. 417.

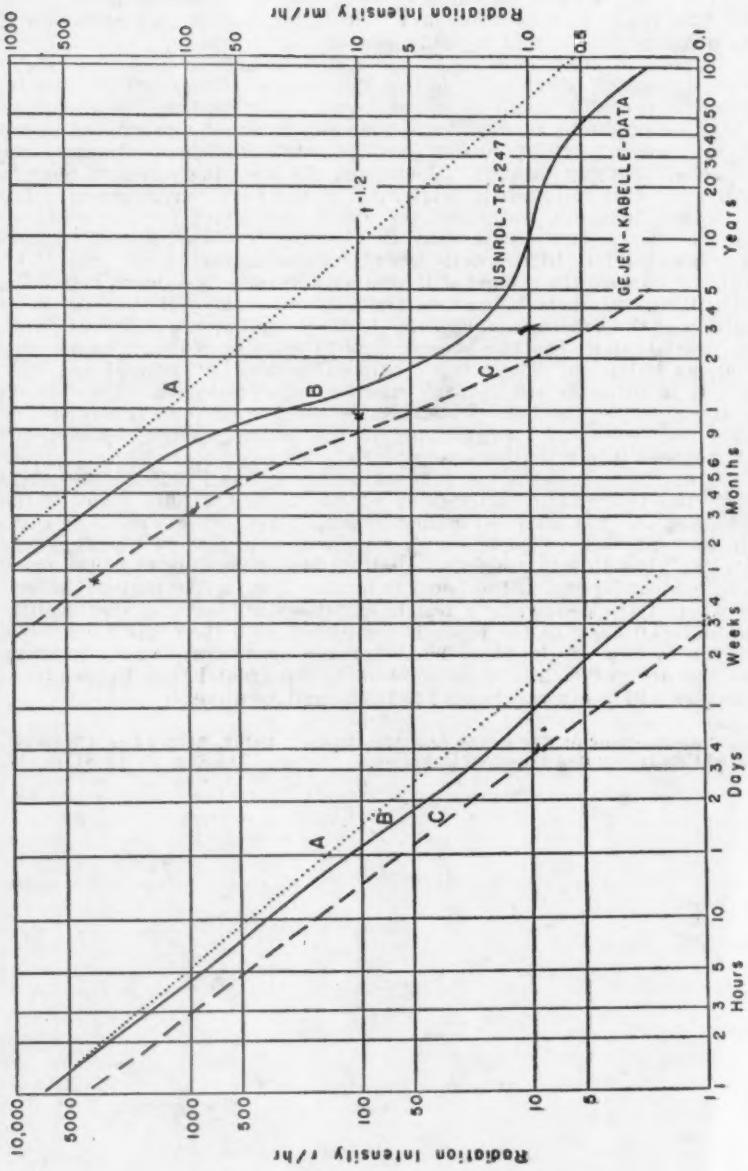

FIG. 1. FALLOUT DECAY CURVES. Ionization dose in air is calculated for a point 3 feet above the earth. Curves A and B represent theoretical values for a flat, impermeable plane.

THE FALL-OFF OF FALLOUT

Assuming that our estimate of 7,000 r/hr represents the intensity of the fission products one hour after detonation, let us project the dose rate into the future. Naturally, as the short-lived emitters die out, the activity of the fission products will fall off rapidly. This exponential decay follows a $t^{-1.2}$ law first pointed [10] out by K. Way and E. P. Wigner. If one examines the average number of photons per disintegration, it drops from a value of 1.2 at 1 hour to below 1.0 at 10 hours, rises to 1.1 at 100 hours and thereafter decreases to 0.2 at 10 years. The average photon energy for U^{235} fission products drops from 0.92 at 1 hour to 0.7 at 12 hours thereafter decreasing to 0.5 at 100 hours; it climbs to 0.6 for 9-month-old fission products, dips to 0.36 at 2 years, and levels off at 0.6 Mev at 10 years. These fluctuations reflect the varying isotopic composition of the fission products as a function of time.

The gamma activity of 3-year-old fission products is the sum of the contributions from three emitters each of which has a 5- to 7-percent fast fission yield [11] in U^{238}. At 3 years, cesium 137 is the dominant emitter; with its 26-year half life it accounts for 68 percent of the residual gamma energy; 299-day cerium 144 adds 13 percent and 2.6-year Pm^{147} contributes 6 percent.

Figure 1 illustrates the theoretical decay curve for a uniform mixture of fission products corresponding to an initial 1 hour intensity of 7,000 roentgens per hour. The solid curve (B) corresponds to data taken from USNRDL–TR–247 for the ionization rate at 3 feet above an infinite plane uniformly coated with U^{235} fission products. The dotted line (A) represents the decal rate according to the $t^{-1.2}$ rule. Curve B requires some modification to adjust for the influence of certain fission products which have a different yield for fast fission in U^{238}. In general the difference between the fission products from slow fission in U^{235} and fast fission in U^{238} is an increase in yield of nuclei in the mass range 100 to 130; this is due to a lateral displacement of the low mass hump in the fission yield curve plus a raising of the bottom of the valley between the two humps.

In view of the other factors which affect the decay curve it is felt that the differences [12] due to using slow fission yields for U^{235} rather than fast fission yields for U^{235} are not as significant before as after one year. For time periods beyond 1 year the specific yields of certain induced activities affect the decay curve significantly.

COMPARISON WITH ENIWETOK DATA

The Atomic Energy Commission has released a number of reports [13] from which one can glean some details of the local fallout which took place in the Bravo test of March 1, 1954. We would expect such field data to reflect lower radiation intensities than the curve B plotted in figure 1 as a theoretical maximum. For shots conducted on barges at anchor in the lagoon environment there would be a fractionation of volatile and gaseous emitters with a subsequent depletion of these nuclei and their offspring in the local fallout. In addition, the data would reflect the effect of weathering and roughness of the surface. Furthermore, there would be the special induced activities peculiar to the detonation and its immediate environment.

Consideration of the field data leads the author to stipulate a realistic decay curve shown as a dashed line (C) in figure 1. A 1-hour rate of 4,000 roentgens per hour has been chosen to be equivalent to the 7,000-roentgen value deduced earlier. The immediate decay characteristic may be assumed to follow the $t^{-1.2}$ rule; this changes to a $t^{-1.2}$ relation which is assumed to be valid up to 3 weeks. Thereafter the slope of the curve is derived from gamma measurements taken in the downwind Marshall Islands.

FIG. 1. FALLOUT DECAY CURVES. Ionization dose in air is calculated for a point 3 feet above the earth, assumed theoretical values for a flat, impermeable plane.

[10] "The Rate of Decay of Fission Products," Phys. Review, 73 (1948), p. 1318.

[11] R. N. Keller, E. P. Steinberg, and L. E. Glendenin, Phys. Review, 94 (1954), p. 969. Also USNRDL reports TR–187 and TR–160 (1958).

[12] J. G. Cunningham, "The Mass-Yield Curve for Fission of Natural Uranium by 14 Mev Neutrons," J. Inorg. Nuclear Chem., 5 (1957), p. 1. See also L. R. Bunney et al., "Radiochemical Studies of the Fast Neutron Fission of U^{236} and U^{238}," U.N. A/Conf. 15/P/643 (September 1958).

[13] "Radioactive Contamination of Certain Areas in the Pacific Ocean From Nuclear Tests," ed. G. Dunning (August 1957); "Some Effects of Ionizing Radiation on Human Beings" TID 5358 (July 1956); "The Shorter Term Biological Hazards of a Fallout Field," ed. G. Dunning (August 1958); also G. M. Dunning, "Criterion for Evaluating Gamma Radiation Exposures From Fallout Following Nuclear Detonations," Radiology, 66 (1956), p. 585.

Followup surveys of Rongelap Atoll have been carried our from March 1954, the most recent data[14] being taken August 1958. Kabelle Island, one of the northern-most in the group, has been most thoroughly monitored. Data are also available for Gejen Island, farther west than Kabelle and closer to the test site. One can make the rough estimate that Kabelle Island was subjected to a 1-kiloton-per-square-mile fallout and Gejen had about twice this level of contamination. So far as the author is aware these constitute the only test plots for which long-term fallout decay data are available, and while they reflect conditions peculiar to tropical islands they do represent practical fallout fields of the same level as the representative field postulated here. In plotting data for these two islands on curve C, Kabelle Island gamma readings taken at 3 feet above ground level have been multiplied by 2. In addition, the author has made an adjustment for contributions of fresh fallout from Operation Redwing (1956) and Operation Hardtack I (1958). The overlays of fresh fallout tend to distort the decay curve and render questionable the interpretation of data in the future (beyond 5 years).

The curve C may be represented by a $t^{-1.5}$ rule from 3 weeks to 6 months, at which the point there is a significantly abrupt change in slope corresponding to a $t^{-2.2}$ relation. At 6 months the curve C is an order of magnitude lower than the theoretical maximum value of curve A. At 5 years the divergence between these two curves is even more pronounced and amounts to a factor of 100. Quite clearly, this departure from a $t^{-1.2}$ dependence is of the greatest consequence for civil defense.

As explained earlier, the contribution of certain highyield products of fast fission as well as neutron-induced activities will become important after 6 months. For example, inspection of the fission yield data tabulated[15] by S. Katcoff shows that ruthenium 106, a gamma emitter with a half life of 1 years, has a 2.7-percent yield for fast U^{238} fission but only a 0.38-percent yield for slow U^{235} fission. The actual bomb yield of Ru^{106} depends upon the effective neutron energy which one assumes and the yield may be somewhat less than 2.7-percent; nonetheless there should be about a sixfold increase in the Ru^{106} content of the Bravo fallout. At the same time, one expects a very considerable (order of magnitude) increase in abundance of emitters such as 2.7-year antimony^{125}. This is qualitatively verified by Drs. R. F. Palumbo and F. G. Lowman[16] in an analysis of Kabelle Island soil collected July 18, 1957.

The fact that curves B and C tend to draw closer together in the 1- to 2-year period is in part due to the higher yield of U^{238} fission products and the presence of induced activities such as Fe^{55}, Mn^{54}, and Co^{60}. These more than offset the depletion in Cs^{137} which occurs as a result of fractionation. Beyond 5 years one would expect the curve C to flatten out unless the Cs^{137} is severely depleted or if it is buried deep within the surface of the earth.

WEATHERING

To make any assessment of the effect of the forces of nature upon the distribution of radioactive species in the soil, it would be of the greatest value to have a good decay curve on a soil sample which has not been subjected to weathering. In lieu of such data the writer uses curve B as representing the unweathered soil situation. The Radiation Biology Laboratory of the University of Washington dredged samples of Biijiri-Rojoa sand on November 7, 1952 about a week after the Mike-megaton shot in Operation Ivy. This sample has been kept in the laboratory and systematically followed ever since, the last measurement[17] being taken December 29, 1958. It is interesting that the last 3 years of the decay curve obey a $t^{-2.1}$ rule. The sample is depleted in Cs^{137} and enriched in Co^{60}; the decay curve shows no sign of flattening off. This may be in part due to the depletion of Cs^{137} and in part to the fact that it represents beta-decay which would be expected to show much less change of slope than the gamma curve.

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[14] Dr. Gordon M. Dunning, Chief of the AEC's Radiation Effects of Weapons Branch, Division of Biology and Medicine, made these data available to the writer.

[15] "Fission-Product Yields From U, Th, and Pu," Nucleonics, 16 (1958), 78.

[16] "The Occurrence of Antimony^{125}, Europium^{155}, Iron^{55}, and other Radionuclides in Rongelap Atoll Soil," UWFL–56 (April 1958).

[17] The author is indebted to Dr. K. Bonham for supplying these data, supplementing the results reported in UWFL–53 "Radioactivity of Invertebrates and Other Organisms at Eniwetok Atoll During 1954–55" (Jan. 6, 1958).

Weathering is a complex interaction between the chemical species present in fallout, their varying physical form, the minerals of the soil, plus, of course, mechanical transport caused by wind, precipitation, and earth movement. One also has to consider the effect of plant and animal life as they apply to the soil surface. One would expect that the rate of descent of the various radioactive species into the soil surface would depend upon the specific type of soil; thus the Marshall Island data are taken to illustrate one weathering possibility and not as typical of all soils. Finally, it must be mentioned that U.S. experience with fallout debris has been limited, in the case of megaton bursts, to a rather special substratum characteristic of Pacific atolls and test conditions designed to minimize local fallout.[18]

Core samples[19] taken on Gejen Island in 1955 showed the following beta activity:

Soil layer	1st	2d	3d	4th	5th	6th inch (betas/min/gm.)
Activity	37,000	37,000	8,000	4,000	4,400	3,400

Data taken from soil on other islands indicate a similar soak-in fission debris down to a depth of 6 to 8 inches. The 1956 resurvey of Gejen soil (table 18 in the reference 18) shows that the residual activity concentrates in the upper inch of soil. Although the data on soil uptake of fission debris are not firm, it appears that, at least in the case of Marshall Island soil, weathering is not severely cumulative in effect. If we compare curves B and C without making allowance for terrain effects, then up to 2 years there is a difference of a factor of about 4. A British estimate[20] assumes a "protection factor of 3" for British soil contaminated with stratospheric fallout.

Weathering effects beyond 2 years will depend very critically upon the nature of the radioelements which then predominate in the fallout debris. And as we have seen, this is likely to be quite variable. For a normal mixture of fission products, the long-term radiation dosage would depend upon the weathering of cesium in the soil. Cesium should be quickly fixed[21] in the upper soil surface, probably in the first inch. Fixation is assumed to be proportional to the colloidal content of the soil and would be greatest in clay soils and least in sandy loams. Radiocesium would be expected to resist leaching even under conditions of heavy (tropical) rainfall.

THE GAMMA HAZARD

The foregoing discussion makes it appear reasonable to use curve C in estimating the radiation dosage to which people might be exposed from a representative fallout field corresponding to a 1-hour level of 4,000 roentgens per hour. We make use of a $t^{-1.2}$ relation up to 3 weeks and a $t^{-1.6}$ up to 3 months. Previous articles in the Bulletin have already spelled out the nature of the fallout radiation dosages during the first day, so these data will not be repeated. Beginning with the second day table I lists the gamma doses for various time intervals.

[18] N. H. Farlow and W. R. Schell, "Physical, Chemical, and Radiological Properties of Slurry Particulate Fallout Collected During Operation Redwing." USNRDL–TR–170. See also C. E. Adams and J. D. O'Connor, "Nature of Individual Radioactive Particles—Operation Redwing," USNRDL–TR–208 (December 1957).

[19] From table 15 of AEC publication "Radioactive Contamination of Certain Areas in the Pacific Ocean From Nuclear Tests," Ed. G. Dunning (August 1957).

[20] N. G. Stewart, R. N. Crooks, and E. M. R. Fisher, "The Radiological Dose to Persons in the U.K. Due to Debris From Nuclear Test Explosions Prior to January 1956," AERE HP/R 2017 (1957).

[21] W. Langham and E. C. Anderson, "Entry of Radioactive Fallout Into the Biosphere and Man," Bull. Swiss Acad. Med. Sci. 14 (1958), p. 434.

TABLE I

Time interval:	Gamma dose (roentgens)	Time interval—Continued	Gamma dose (roentgens)
2d day	950	2d month	220
3d day	500	3d month	100
4th day	300	4th month	60
5th day	225	5th month	40
6th day	175	6th month	25
7th day	120	6th to 12th month	60
2d week	535	2d year	20
3d week	285	3d year	6
4th week	140	4th year	3

Use of the $t^{-1.2}$ law involves a great overestimate of the actual radiation hazard over long periods of time. For example, the 1- to 4-year dose is 27 times higher than that represented by curve C. Since the dose beyond 4 years is very cesium-sensitive, any estimate must depend upon assumptions about the degree of fractionation of Cs^{137} in the fallout and degree of weathering. If one assumes no fractionation and a uniform deposit over a hard, flat plane then the level corresponding to 400 curies of Cs^{137} per square mile would produce a dose of 380 roentgen over a period of 50 years. No experimental data extend much beyond 5 years but if one assumes that curve C flattens off and reaches a value close to 0.1 millirad per hour at 50 years the integrated dose would be about 50 roentgen.

The application of these data to the problem of survival in time of nuclear war is discussed in the accompanying article.

[From the May Issue (1959) of the Bulletin of the Atomic Scientists]

FALLOUT AND HOME DEFENSE

(By Ralph E. Lapp)

Soviet successes in the nuclear weapons and missiles field together with an unremitting arms race call for a new look at the problem of home defense. This is all the more necessary because of a general prevailing impression that civil defense is hopeless.

There is no use in avoiding this blunt statement of the issue at this stage of world affairs. Moreover, the rapid succession of mounting hazards—the megaton, fallout, and ballistic missiles—forms a terrible triad. Civil defense planners have never been able to keep step with the tempo of arms development and very often they were hamstrung in their efforts to obtain the necessary planning information from the Defense Department and the Atomic Energy Commission.

Excellent studies of the civil defense problem were made available in 1958, notably the testimony[1] of Dr. Ellis A. Johnson, Director of the Operations Research Office, Johns Hopkins University, and the RAND report,[2] the gist of which was presented by Dr. Herman Kahn in the January bulletin. These analyses deserve careful consideration because they point out the profound interrelation of population survival and sound defense policy; furthermore they maintain that an effective civil defense is possible.

The triple impact of megatons, fallout, and missiles convinces most Americans that their lot will be a hopeless one should the United States be subjected to a nuclear attack. The ORO and RAND assertions to the contrary have not as yet made an appreciable dent in the public attitude, certainly not in Congressional attitudes. The reshuffle of the Federal Civil Defense Administration into the new Office of Civil Defense Mobilization has made little apparent change in the Administration's handling of the civil defense issue. Civil defense is still in the research and development and planning stage. And it is now almost 14 years since Hiroshima.

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[1] Pp. 241–269 of the Holifield Civil Defense Hearings, House Government Operations Committee, May 5, 1958.

[2] "Report on a Study of Nonmilitary Defense," RAND Corp. Report R–322–RC (July 1, 1958).

No one in Washington expects that OCDM will be energized with a massive infusion of funds to support a national civil defense program on the scale of multibillion dollar appropriations. The Congress continues to be highly skeptical of any increases in civil defense appropriations, and the White House has given no indications of asking for a budget sufficient to finance a national shelter program.

I feel that under these conditions, the problem of civil defense transforms to "home defense," and the citizen must look to his own security. This would seem to be in line with the views of Civil Defense Administration Gov. Leo Hoegh who answered in reply to a question about shelter construction:[3] "Of course, we have not advocated a Federal construction program. We advocate this, the self-help program. That's nothing new. For instance, back in the Indian age our forebears, when they built their homes, also provided a fortress. In 1958 the American people in their own home should provide themselves protection from radioactive fallout. We give the guidance and the direction."

Our forebears were confronted with the challenge of the bow and arrow and the tomahawk. Today we face the swifter-than-sound ICBM, the incomprehensible megaton, and the unsensed threat of radioactive fallout. This disparity is so immense that the average person is overwhelmed; he looks to his Government for guidance, and he is advised to "do it himself."

MISSILE WARHEADS

Mr. Khrushchev has implied that the Soviets have a compact nuclear warhead with a 5-megaton explosive equivalent. It is assumed that this nuclear explosive is compact enough to fit into an ICBM nosecone and that it is about 1.5 tons in weight. This constitutes a very considerable accomplishment in weapon development. Little is known about the actual weight of the Soviet bomb package, but analysis[4] of the October 1958 tests shows that the Soviets released about 20 megatons (strontium equivalent) of fission energy to the stratosphere. It would seem prudent to assume that the Soviets have developed a 5-megaton ICBM warhead. The radio-chemical data available to the author suggest that compactness in this missile warhead has been achieved at some expense in terms of nuclear material. The burning of cheap U^{238} involves a weight disadvantage in missiles but is useful in high-yield airdropped bombs such as the 20-megaton weapons carried by the U.S. strategic bomber, the B–52.

Continued nuclear testing should result in an early doubling of megatonnage in missile warheads and with increased development of rocket fuels, warheads of 20 megatons must be anticipated. By the same token bomber weapons may be doubled and tripled in power, i.e., 40 and 60 megatons. It is understood that the Strategic Air Command is thinking in such terms for B–52 and B–58 carried bombs.

With the development of mega-thrust propulsion plants and possibly with the perfection of nuclear-powered ramjets the transportation of 100-megaton bombs appears feasible, although this is farther in the future. The military worth of such high-yield weapons is arguable, depending upon what purposes are involved in the military applications. If the weapons are meant for blast applications for the reduction of strategic targets of "hardened" construction, then blast pressures of the order of 100 pounds per square inch are required. A 1-megaton warhead such as might be developed for a Polaris missile would produce 100 pounds per square inch at five-eighths mile; a 5-megaton warhead (present Soviet ICBM capability) would extend this blast to 1 mile; a 20-megaton SAC bomb would reach to 1.7 miles and a super 100-megaton bomb would range out to 3 miles.

Given a missile accuracy such that 50 percent of the warheads land within a circle of 5–10 mile radius it is obvious that huge numbers of Polaris-type missiles would be required to knock out a hardened missile site and very considerable numbers of 5-megaton missiles would also be required. On the other hand, 20-megaton bombs launched from short range by B–52s or B–58s with greater accuracy could be very effective; this is a prime reason why the U.S. Air Force believes that bombers will still be in business 5 to 10 years from now.

Judging from U.S. bomber capabilities, our strategic retaliation against Soviet attack would involve a one-day level of attack in excess of 10,000 megatons.

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[3] Transcript of "Meet the Press" television program of September 7, 1958.

[4] Speech of Dr. W. F. Libby, March 13, 1959. The author has also received radiochemical analyses from Japanese scientists.

Actual on-target deliveries might reduce this considerably depending upon the alert status of SAC bases and the nature of Soviet defenses. It is not clear why such a high level of attack is contemplated on a second-blow basis since in making the first-strike Soviet military installations would presumably have fulfilled their prime role. Admiral Arleigh A. Burke, Chief of Naval Operations, has questioned the strategic mission of the Air Force in a recent speech[5] in which he stated: "* * * We recognize that in general nuclear war missile forces can no longer attempt to destroy their enemy's counterpart without destroying the corporate body of the enemy state itself, provided all these forces are stationed within the heart of the homeland." This raises the fundamental issue of the wisdom of locating prime strategic bases within continental United States. The level of enemy attack upon the United States will depend upon the number and nature of U.S. strategic bases; thus our military leaders may be making profoundly wrong decisions in locating hardened missile sites within the U.S. borders. Each hardened site may cause the enemy to allocate immense megatonnage to its destruction but the fallout from these bombs will inevitably spill out over the U.S. population and food areas.

The foregoing suggests that "the megaton assumptions" for the United States meaning the commitment of bombs to U.S. targets may vary within wide limits and may actually be determined by our own decisions. The present 30-odd strategic bases within continental United States are nonhardened or "soft" and it appears that Russia could be forced to commit a minimum of 1,000 megatons to these targets. Additional targets would double or triple this megatonnage during the time span of the next 3 years. It is within the framework of this assumption that the author proposes to view the civil defense problem. Obviously, the feasibility of civil defense depends very critically upon the megaton assumptions because a decade from now 3,000 megatons may be a small fraction of the Soviet strategic capability.

FALLOUT AND SURVIVAL

The current status of our civil defense offers little hope that the primary effects of thermonuclear weapons can be minimized to any significant degree. The protective construction necessary to reduce the sledge-hammer effect of the megaton blast on cities involves a degree of metropolitan surgery which is deemed unattainable now. When there was time our cities were not made less vulnerable by dispersion, and now that there is little time the metropolitan areas cannot be hardened like a missile site.

However, the random sprawl of our cities coupled with the inherent inaccuracy of ballistic missiles makes it probable that very large chunks of our metropolitan areas will remain outside the zones of heavy blast damage. Populationwise, the situation is even more favorable since ground zero is equally probable for downtown and the suburbs.

As I see the problem for the average American, he can't do very much about combating the primary effects of megaton weapons; only the rara avis will go to the trouble and expense of building a blast shelter. However, the big problem once the impact of the blast heat ceases to be felt upon the stricken community is protection against radioactive fallout. This problem centers upon the family home, and it is for this reason that the term "home defense" applies.

Vast areas remote from the actual bomb bursts will be subjected to lethal radioactive fallout; in some cases where there are multiple bursts and strong winds the lethal distance may extend to 500 miles from ground zero. Areas downwind of prime strategic targets will fall in this category. Thus, the true lethal potential of a nuclear attack derives from the fallout hazard. Primary lethality of megaton weapons centers upon an area 20 to 40 times smaller than that subject to lethal fallout.

I believe that the average American's understanding of radioactive fallout is pitifully inadequate. Judging from contacts with thousands of people during the past 5 years, I arrive at the conclusion that there is a deep-rooted feeling that there is no way to escape death from fallout. It is for this reason that I reexamined the fallout radiation hazard. (See previous article.)

The fallout field which has been assumed seems realistic; i.e., 2 kilotons of fission debris per square mile corresponding to an actual rate of 4,000 roentgens per hour 1 hour after the bomb burst. The first-day radiation exposure depends

[5] Given before the Chamber of Commerce, Charleston, S.C., February 20, 1959.

very critically upon the time of fallout. It may require only 1 hour for complete fallout close to the target or as much as 18 hours farther downwind.[6] Reliable data on megaton-class fallout are fragmentary, but Dr. Paul C. Tompkins, scientific director of the U.S. Naval Radiological Defense Laboratory, testified before the Holifield civil defense subcommittee[7] that "the major residual radiation threat does not occur within range of physical damage." It was stated that peak radioactivity never occurs at the crater, but about 50 to 75 miles downwind.

The first day fallout is illustrated by the following schedule of roentgen doses:

TABLE I

Time interval:	*Gamma dose (roentgens)*
1 to 2 hours	2,500
2 to 3 hours	1,250
3 to 4 hours	800
4 to 5 hours	550
5 to 10 hours	1,500
10 to 24 hours	1,550

Each hour that the fallout is delayed reduces the first-day integrated dose by hundreds and thousands of roentgens. If we assume an effective time of fallout as 3 hours, the first-day exposure to a person standing in the open is about 4,000 r. Some analysts[8] believe that a nuclear attack upon the United States would produce areas in the Northeast where the 2-day radiation dose would exceed 10,000 r. It is estimated that the variable fallout patterns would overlap to blanket many states in a coat of radioactive contamination.

Subsequent in-the-open radiation exposures are listed in another table I on page 186 of this issue.

RADIATION PROTECTION

The fundamental rule for survival in time of fallout or suspected fallout is belowground shelter. This evasion action must take priority over all other activities during the first few days following the outbreak of nuclear war.

Since it is doubtful if many Americans will possess prebuilt radiation shelters, the do-it-yourself approach must be followed. The hours of grace before lethal fallout may reach the earth allow time for last-minute improvisation of radiation shelters. The ordinary basement provides a ten- to twenty-fold reduction in the radiation dose. Further reduction can be attained by lying prone in one corner of the basement but for many regions it will be necessary to provide additional below ground shelter. This can be provided by use of the foxhole principle[9] or by shielding with some dense material. A tunnel dug in the cellar wall would provide excellent protection. Stacking up bags of coal, sand, or containers of water in a corner of the basement would also reduce the radiation dose.

A committee of the National Academy of Sciences is pondering the problem of setting up a schedule of "allowable" radiation doses for a nuclear catastrophe, but the final report is not expected for several months. Presumably, 25 roentgens might be stipulated for the first day and 100 roentgens for the first week. The shelter-protection factor required to keep the dose below 25 roentgens during the first day would range from 100 to 500 for most areas. Using table I on page 186, it is seen that this protection factor drops rapidly during the first week, permitting the holed-up survivors to emerge from cramped quarters after 2 or 3 days and enjoy more freedom of movement in the basement.

During the third day the external radiation would drop to 10 roentgens per hour and limited excursions within buildings would be possible for adults. At the end of 1 week the outdoor radiation level would drop to 4 roentgens per hour in open fields (it might build up to higher values in built-up areas where the fallout debris naturally concentrates), and limited above-surface excursions could be made.

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[6] W. W. Kellogg, R. R. Rapp, and S. M. Greenfield, "Close-in Fallout," J. Meteorology, 14 (1957), p. 1.

[7] Pp. 209–210 of reference 1 (May 2, 1958). It appears that these data focus upon Pacific tests where the substratum is largely water. Very little data exist for the case of megaton bombs burst on continental surfaces.

[8] For example, Dr. Ellis A. Johnson in his speech before the Washington Philosophical Society, Washington, D.C. (Mar. 28, 1959).

[9] R. E. Lapp, "Radioactive Fallout," Bulletin, 11 (February 1955), 45.

DECONTAMINATION

Natural decontamination of building materials may occur as a result of weathering processes.[10] Actual tests[11] carried out at the Nevada proving ground showed that a 2-inch rainfall following fallout reduced the indoors radiation dose to one-tenth to one-twentieth the dose measured in an adjoining field. The radiation level just above the floor was one-tenth that at a height of 7 feet inside the house.

F. P. Cowan[12] has investigated the buildup of fallout on construction materials and he has found that smooth-surfaced materials such as aluminum accumulate the least fallout and yield most quickly to decontamination, whereas asphalt and asbestos shingles hold the fallout more tenaciously.

After 1 week a properly indoctrinated householder might attempt to reduce the contamination on the roof. A twentyfold reduction of the roof contamination (as compared with open-field levels) seems feasible. Since the roof contamination contributes as much radiation dose to the basement as the skyline of radiation from adjoining land[13] an overall tenfold dose reduction for basement dwellers is possible.

Decontamination of ground areas and pavements will involve an organized effort and substantial equipment. The U.S. Navy has had practical experience in radiological decontamination as a result of the Bikini bomb tests in 1946. Data[14] from the U.S. Naval Radiological Defense Laboratory show that firehosing of asphalt surfaces contaminated with dry fallout can reduce the level of radioactive thirtyfold.

In the absence of extensive decontamination it would appear wise to live very cautiously during the 1-week to 1-month period after attack. The second week dose of about 500 roentgens should be kept below 20 roentgens and preferably below 10 roentgens. The same rule applies to the third week. The 140-roentgen dose which would be accumulated by full aboveground exposure during the fourth week can be cut to 7 roentgens by an overall reduction factor of 20; this still requires basement living unless decontamination has been effective.

BEYOND ONE MONTH

Once the challenge of the first month of postattack living has been met, the radiation hazards in the following months can be put into manageable proportions by cautious living. At about this time the outdoor levels will be about 10 roentgens per day—still too high for long-term aboveground movement. However, local decontamination and restricted movement plus indoor living as much as possible should make it possible to keep the radiation dose below 10 roentgens for the second month. Thereafter the radiation exposures call for caution, but the problem is clearly no longer an acute one.

After 4 months the maximum 24-hour dose for a man in the open would be about 1 roentgen, although it might be 10 times less in a decontaminated area. At the end of 1 year an untouched area should exhibit about 0.1 roentgen per day and the total dose in the second year after attack would be about 20 roentgens, so that return to ordinary life so far as the external hazard is concerned would be indicated. For people who had accumulated 100 roentgens in the first year an additional 5 roentgens in the second year (allowing for shielding) would not constitute undue risk. Since the impact of the attack might replace our industrial economy with a colonial type of existence, millions of people would have to till the soil; this would involve greater exposure, but it would not be prohibitive.

These conclusions apply to the radiation field specified by a fallout of 2 kilotons of fission products per square mile. It would seem that this kind of a fallout field is a reasonable projection through the early 1960's. Beyond that time it is

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[10] See L. Machta and K. M. Nagler, "Meteorology-Fallout and Weathering," p. 3 in AEC publication, "The Shorter-Term Biological Hazards of a Fallout Field" (1958).

[11] R. T. Graveson, "Radiation Protection Within a Standard Housing Structure," NYO-4714 (November 1956).

[12] "The Accumulation of Radioactive Fallout on Typical Materials of Construction," BNL-497 (March 1958).

[13] J. A. Auxier et al., "Experimental Evaluation of the Radiation Protection Afforded by Residential Structures Against Distributed Sources," CEX-58.1 (Jan. 19, 1959). See also M. J. Berger and J. C. Lamkin, "Simple Calculations of Gamma-Ray Penetration Into Shelters: Contribution of Skyshine and Roof Contamination," Report NBS-2827 (February 1958).

[14] "Radiological Recovery of Fixed Military Installations," USNRDL report dated August 1953.

probable that more intense fields must be considered, doubling and tripling the radiation doses specified in this article.

The assumed radiation field would be accompanied by a fallout of 200 curies of strontium 90 per suare mile if there is no fractionation which depletes the local fallout in Sr^{90}. This heavy fallout raises the question as to the human use of foods grown on such contaminated land. Besides Sr^{90} one has to consider the shorter lived fission products and induced activities which might pose a hazard as food contaminants. If the nuclear attack took place during the growing season much of the crop would have to be sacrificed. Thereafter many areas would be denied to dairy farming for a decade and the survivors would be forced to derive their calcium from other sources (currently the average American takes 80 percent of his calcium from dairy products). Thus, in projecting to the emergency conditions in the postattack years the present Sr^{90} levels must be adjusted to apply. There are many unknowns involved in estimating the ultimate biological damage from crops grown on land contaminated to a level of several hundred curies of Sr^{90} per square mile but the gradual buildup of Sr^{90} in human bone would present an acute health problem. Unless heroic measures were adopted to inhibit the intake of Sr^{90} the body burden of this radiopoison would exceed the threshold for lethality.

The strontium 90 levels which might be anticipated for 100-megaton bombardment of hardened missile sites such as are planned for 10 areas in our Western States would approach the kilocurie-per-square-mile value and such land would be denied to agriculture for more than just a decade. One wonders whether this point has been considered in the siting of these military installations.

As a weapon of ultimate vengeance the threat of soil contamination is a vicious one. However, it is also a rather subtle hazard requiring a degree of imagination for its full appreciation. In this sense the strontium 90 hazard resembles the genetic hazard. On the other hand, a country such as the Soviet Union would be vulnerable to deprivation of future crops since it has small food reserves. Conceivably, the threat of crop contamination might act as a deterrent to the Soviets. The concept of a Carthage on a continental scale is new to war and is a direct offshoot of the megaton-class weapon.[15]

In summary, the biological consequences of local fallout present an immense challenge to civilization. Over the short term the external radiation threat appears to be of manageable proportions providing people understand the nature of the hazard. The internal hazard does not appear to be of the same degree of lethality as that formed by the external radiation.[16] Crop contamination poses a serious long-term problem, and it is not clear whether a postattack economy could support the kind of agriculture which could minimize the uptake of strontium 90 from the food supply.

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[15] This point was emphasized in "Strontium Limits in War and Peace," published in the Bulletin, 12 (November 1956), 287, in which it was stated: "The best hope for peace, it would appear, may be common understanding of the nuclear consequences of recourse to superbombs. If this be true, then man's foreknowledge of the effects of nuclear weapons may serve as the ultimate deterrence to war."

[16] This discussion has not embraced the short-term toxic effect of the retention in the body of gross fission products.

APPENDIXES

APPENDIX I—SUBCOMMITTEE QUESTIONNAIRE AND REPLIES

A. Text of Questionnaire

MILITARY OPERATIONS SUBCOMMITTEE,
COMMITTEE ON GOVERNMENT OPERATIONS,
Washington, D.C., February 10, 1960.

DEAR GOVERNOR: The Military Operations Subcommittee of the House Committee on Government Operations is engaged in a study of civil defense in the United States, with special reference to the construction of shelters for protection against radioactive fallout in the event of a possible enemy attack.

Two years ago, the Federal Civil Defense Administrator, Governor Leo Hoegh (now OCDM Director), testified to our subcommittee that the national civil defense policy would include the use of shelters to provide protection from radioactive fallout. Governor Hoegh stated that the Federal Government would encourage the construction of shelters throughout the United States through certain specified efforts, including steps to educate the public concerning the hazards of radioactive fallout.

It would be helpful if you would advise the subcommittee what influence this Federal policy has had on civil defense in your State. We are specifically interested in obtaining answers to the following questions:

(1) How many civil defense home shelters have been constructed in your State? (Would this information be reflected in building permits issued during the past 2 years?)

(2) How many public buildings in your State have been modified to provide shielding from fallout?

(3) Does your State civil defense agency have an underground control center?

(4) Have any underground structures having a dual civil defense purpose, such as parking garages, been constructed in your State?

(5) Has fallout protection, in the form of structural modifications, been incorporated in any of your public schools? If so, in how many?

(6) Have evacuation-reception centers been prepared either within your State or in other States for use by evacuees from your State? Are such reception centers stocked with emergency supplies and do they provide adequate protection against radio active fallout? How many people will they protect?

(7) What changes in Federal policy do you think are necessary to achieve greater fallout protection for the people of your State?

It would be appreciated if you would supply this information to the subcommittee at your earliest convenience in order that we may complete our study in preparation for public hearings to be conducted in the near future. We would be interested also in any other comments you may wish to make concerning shelter requirements in your State and the operation of the national civil defense program as it affects your State.

Sincerely yours,

CHET HOLIFIELD,
Chairman, Military Operations Subcommittee.

(Substantially the same letter was sent to mayors of major cities.)

B. Replies to Questionnaire Alphabetically by States

CITY OF BIRMINGHAM, ALA.,
February 24, 1960.

Hon. CHET HOLIFIELD,
George Washington Inn,
Washington, D.C.

DEAR CONGRESSMAN HOLIFIELD: The shelter program in this area has just begun to show signs of interest. I feel quite confident that as time progresses the program will accelerate. The only assistance we have received from the Federal Government is in the form of pamphlets showing shelter designs and some promotional work to educate the public. No funds or other material assistance have been given in this particular program.

In answer to the seven questions:

1. Number undetermined at this time. Our last report would indicate approximately 15. One contractor is incorporating fallout shelter plans in 30 new homes of the $20,000 to $30,000 class. Our city building permit department issues fallout material, including various plans, etc., with each new or remodeling building permit, which is beginning to create interest among the builders.
2. None so far as this office knows and there are no local funds available to make this survey. Such survey would cost $65,000 to $75,000.
3. No.
4. No.
5. No.
6. Evacuation-reception centers are established and provide partial protection against fallout. No emergency supplies are stocked other than the 200-bed emergency hospital, which, of course, contains medicine and medical supplies.
7. It is recommended that every critical target area, such as the city of Birmingham, be provided Federal funds to make surveys of existing shelters and the promotion of additional new constructions. Such surveys have been made in various sections of the country.

It is most essential that funds to implement Public Law 85-606 be provided at this session of Congress if civil defense throughout the Nation is expected to make any progress. Local governments simply do not have the funds available without this Federal assistance.

Sincerely,

J. W. MORGAN, *Mayor.*

MONTGOMERY CITY-COUNTY CIVIL DEFENSE HEADQUARTERS,
Montgomery, Ala., March 3, 1960.

Hon. CHET HOLIFIELD,
Chairman, Military Operations Subcommittee,
House of Representatives,
Washington, D.C.

DEAR SIR: Your letter of February 10 to Mayor Earl D. James, city of Montgomery, Ala., has been referred to the undersigned for reply.

In order that the questions were raised in your letter the following information is submitted:

1. Three civil defense home shelters have been constructed in our city. This information would not necessarily be reflected in building permits issued during the past 2 years. We know of two other civil defense home shelters built in neighboring support counties for which we furnished technical information.
2. No public buildings in our city have been modified to provide shielding from fallout. Provision has been made for sandbagging windows, water for wash down of roofs and utilization of existing water curtains in the event of radioactive fallout. A new building soon to be constructed by the Alabama Power Co. will provide consideration of this factor.
3. Our local civil defense agency, which includes the city and county of Montgomery, Ala., does not have an underground control center, but it is contemplated that it will be in a below ground basement.
4. No underground structures having a dual civil defense purpose, such as parking garages, have been constructed in our city.
5. No fallout protection in the form of structural modification has been incorporated in any of our public schools. The construction of a prototype com-

munity shelter is to be built in one of the high schools. The board of education, which operates both the city and county schools, is considering and it is believed will pass the requirements that all new school buildings take the fallout protection factor into consideration when they are constructed. Both the city and county governing bodies are considering the same requirement as the school board, insofar as it applies to buildings constructed with city or county funds.

6. No evacuation-reception centers have been prepared for use by evacuees from our city in the event of an emergency. It is not felt that they are required.

7. We do not believe that there are any changes in Federal policy necessary to achieve greater fallout protection for the people of our city. It is believed that the greatest assistance can be provided by:

An intensification of stressing radioactive fallout home shelters;

A fallout protection factor be incorporated in all new public structures;

An evaluation of existing structures to afford radioactive fallout protection to the population;

Private construction be encouraged to incorporate this feature in their buildings.

It is noted that you would be interested in any other comments we may wish to make concerning shelter requirements in the operation of the national civil defense program as it affects our city. We would like to take this opportunity to make the following comments.

Montgomery City and County is the only area in the United States in which a complete engineering architectual evaluation of all the buildings in the city and county has been made to determine their suitability to protect the population from radioactive fallout. In our opinion this has turned up surprising information:

(*a*) It was found that virtually no fallout protection whatever existed outside the city limits.

(*b*) Eighty percent of the suitable shelter spaces are located in the downtown area of the city, and the remaining 20 percent are within the city limits.

(*c*) That the city's existing structures have spaces for 200,000 people, affording a protection factor of at least 10. These spaces are more than the population of the city and county.

(*d*) That the city's existing structures have spaces for 500,000 people, affording a protection factor of at least 5. These spaces are more than three times the population of the city and county.

(*e*) It was found that the relationship of population to shelter was 145,000 city residents to 30,000 rural residents. The relationship of the population in distance to the nearest available shelter is—

Twenty-four percent of the city population live within one-half mile of their shelter.

Forty-one percent of the city population live within 1 mile of their shelter.

Eighty percent of the city population live within 2½ miles of their shelter.

Ninety-eight percent of the city population live within 4 miles of their shelter.

Twenty-three percent of the rural population live within 5 miles of their shelter.

Sixty-four percent of the rural population live within 15 miles of their shelter.

Ninety-nine percent of the rural population live within 30 miles of their shelter.

It is believed that the above relationship will be applicable to a large part of the United States. We feel that one factor will enter into the number of shelter spaces available: the fact that Montgomery is the capital of the State and, as a result, has a higher number of heavy masonry type buildings than would normally be expected in a city of 145,000 population in this section of the country. In many areas of the country, caves, mines, homes, and buildings with basements and other such structures would more than offset this factor. As an example, Birmingham, Ala., with its many mines, is an exception within our own State.

We feel that in evaluating shelters for radioactive fallout protection that it is necessary to consider the closeness of the shelter to the probable ground zero point of a nuclear explosion, whether it be an H-bomb or an accident involving

a nuclear reactor. In the event of war it is believed that all SAC bases would be a prime target and any structure near such prime targets, although outside of the blast area, would of necessity require a tremendously higher protection factor than a shelter located a hundred miles or more from the sight of the blast.

One of the most important phases of the radioactive fallout shelter program should be an inventory by each city of its best existing structures to serve as radioactive fallout shelters. This survey can be made by a trained crew from an automobile and would not require an engineering analysis of the structures. The whole purpose of the survey would be to designate the most suitable structures within a city to protect the population from radioactive fallout. Whether the protection factor afforded would be sufficient to protect sufficiently would depend upon the distance from ground zero of the nuclear explosion. The stressing of the construction of home shelters should be vigorously pushed.

It is strongly believed that the single most important factor in affording civil defense in any form is the acceptance on the part of the local governing bodies of the city, county, and State, that they and they alone are responsible for the protection of their citizens. Unless these political subdivisions genuinely wish to provide the protection to their populations, it will be impossible to accomplish it. These units of government must be made aware of the fact that it is they and they alone to whom the population will look to and expect to be provided for in the event of disaster. The governing bodies of a city, county, or State should accept the responsibility of disaster control, which civil defense is, the same as it accepts responsibility for police, fire, and health protection. Then and then only will adequate civil defense be provided.

The cost of accepting and putting into effect such a civil defense or disaster control program would be exceedingly nominal to the city, county, or State. Within our city-county we have found that the prime responsibility to provide this protection rests on our police, fire, water works, utility companies, and medical profession. A radioactive fallout shelter program basically is nothing more than the continued operation of a city under adverse conditions. Utilities must munction, police and fire protection must be provided, and the only change in the problem is that radioactivity must be reckoned with, which can be done when performed a reasonable distance from the site of a nuclear explosion.

Respectfully submitted.

PRICE C. MCLEMORE, *Director.*

STATE OF ALASKA,
Juneau, February 29, 1960.

Hon. CHET HOLIFIELD,
Chairman, Military Operations Subcommittee,
U.S. Congress, Washington, D.C.

DEAR MR. HOLIFIELD: In answer to your letter of February 10, 1960, received in this office on February 24, regarding civil defense policies of this State, the following information has been furnished by the director of civil defense, Department of Public Safety:

(1) In regard to home shelters within the State, we have no accurate count as to how many have been constructed, although numerous copies of the pamphlet having to do with the construction of these shelters have been distributed in the main population centers of the State. The Federal Government, through OCDM, will construct a prototype shelter at the University of Alaska for public demonstration and for research by various members of the university staff. Another shelter is to be built by OCDM in Anchorage in a private dwelling. It will be of the basement-type construction. The one at the university will be an underground shelter.

(2) We know of no public buildings within the State of Alaska that have been modified to provide shielding from fallout.

(3) The State civil defense agency does not have an underground shelter. For purposes of warning, arrangements have been made to utilize military facilities at Elmendorf Air Force Base in case of attack.

(4) The State of Alaska has very few underground parking garages and, as a consequence, this phase of the program offers little adaptation in Alaska.

(5) Many of Alaska's newer schools could be modified for fallout protection but, as far as we know, none have been designed with this in mind.

6. We have two evacuation reception centers and plans for others in the future. The emergency centers, one of which is located at Seward, Alaska, 130 miles south of Anchorage, a target area, are supplied with emergency medical

and food supplies, and there are several areas within the city that would be adequate for fallout protection. Fallout studies have indicated that a nuclear disaster in Anchorage would cause little, if any, fallout in the Seward area, at least not a dangerous amount. Another evacuation reception center is located on the outer fringe of the Fairbanks area, but it is not adequate for the present needs of the community and is too near a possible target. Plans to relocate the reception center in this area are being made and its relocation will be carried out this summer. It is estimated that the Seward reception Center could handle upwards of 20,000 people for a period of 2 weeks with present supplies on hand.

Emergency hospitals prepackaged in the Anchorage area could handle 400 patients. There is a 200-bed hospital in the Fairbanks area.

(7) In the opinion of the State director of civil defense, the only change in Federal policy that could achieve greater fallout protection for the people of this State, would be a requirement that all new construction financed by FHA or other Government agencies be designed to make fallout shelters an integral part of the construction. In the opinion of the director, this would be the only way we could make headway in this program. This would demonstrate that the Federal Government is sufficiently concerned about the matter to enact legislation to bring about adequate protection for the citizens of this Nation.

The director of civil defense informs me that his agency is giving priority to the fallout-shelter program by every means at hand, and that the agency is also endeavoring to institute comprehensive radiological defense programing for the State. It is the belief of the director that the two shelters to be built this year by OCDM in Alaska will aid in acquainting the general public with the need and desirability of such construction in the homes of Alaskans. An order has been placed with OCDM for a shelter that can be transported from place to place for public exhibition throughout the State. In addition, he informs me that the widest possible publicity will be given to the report, "Survival in a Nuclear Attack," rendered by the committee on fallout protection for the State of New York. This, plus the annex that accompanied it for architects and engineers, will do a great deal to aid in this program.

It would appear, however, that only Federal legislation of the nature mentioned will be purposeful in assuring fallout shelter for appreciable numbers of our people.

Sincerely,

WILLIAM A. EGAN, *Governor.*

MARICOPA COUNTY AND CITY OF PHOENIX
CIVIL DEFENSE-JOINT COUNCIL,
Phoenix, Ariz., March 9, 1960.

Hon. CHET HOLIFIELD,
Chairman, Military Operations Subcommittee, Washington, D.C.

DEAR SIR: Your letter of February 10, 1960, addressed to the mayor of Phoenix, with reference to civil defense matters, was forwarded to this office for reply.

Your questions are answered as follows:

(1) To our knowledge there have been 6 excellent shelters constructed; however, we have reason to believe that many more are in process of construction since some citizens do not care to publish their activity. We have issued hundreds of shelter plans, and have contacted most of the architects and building contractors with reference to this program. One builder has already constructed a shelter in one of his homes as a sample and a couple of resorts have stated they may construct shelters for the use of guests. One of the duties of a member of my staff is to continually stress the shelter program and we believe that many more will be built due to this activity.

(2) We have no knowledge of any public buildings in Phoenix being modified to provide sheltering from fallout.

(3) The local civil defense agency has an excellent underground control center, built to Federal specifications with a filtering system and nearly blast proof throughout. This control center was erected, starting in August 1955 and accepted June 26, 1957, and has within it the facilities of housing and feeding the heads of county and city departments. We have, within the control center, facilities to sound 21 sirens throughout the valley; 14 different radio frequencies of various governmental agencies, a microwave radio system of our own, tied in with the weather bureau and every

incorporated community of the county, together with the sheriff's department and Arizona Highway patrol.

(4) Our answer is that there are two that could qualify and we have consulted the builders of every new construction to provide underground parking garages with modifications for this purpose.

(5) No; however, we have furnished plans to several schools for underground shelters and one school, in particular, has the plans ready and they have already been forwarded to the office of OCDM with a request for Federal funds.

(6) The Arizona State survival plan established reception centers for the 10 evacuation routes leading out of Phoenix. All these centers, except two, are outside of our county. The two within our county are small communities and in case of evacuation the people would have to use existing structures and this is also the case in other reception centers. As regards emergency supplies, we have always stressed that everyone should carry food and water in their cars, since we cannot expect the taxpayers of small communities to have a constant supply of food and other supplies to be used at some unknown time, by refugees from our large city. We doubt very much if any reception center in the United States has solved this problem since warehouses of emergency supplies must be maintained by a larger governmental unit than the city, in other words, the constant changing of these supplies and their danger of deterioration and an adequate rationing system would have to come either under State or Federal control.

(7) We agree with the logic of protecting as many people as possible, but we feel that it will be more than word of mouth education. It will have to have some element introduced that will be more effective than just asking an individual to do something on his own when he might have his property assessment raised by doing it and when he has had too few examples from those in high position regarding this matter.

We believe that if FHA loans could carry some sort of requirement of a shelter in each one of the homes or buildings for which they insure the loan, this might stimulate more interest in shelters.

Stressing the importance of shelters and totally disregarding any thought of evacuation isn't logical at the present time, since those without shelters should at least be provided with some plan of leaving the location if sufficient time exists. We follow that policy in our community. The Federal Office of Defense Mobilization, by their emphasis on shelters and ignoring evacuation plans, should be adjusted until the time comes when adequate shelter is available to all.

The policy of the Federal Office of Defense Mobilization in issuing radiological monitoring kits to all the high schools prior to the ability of the school to use same in a proper manner, should be changed and these kits furnished to local civil defense agencies. Our Office works closely with each school and we have two school alerts each year and we find many schools who have in their possession many valuable instruments sent to them directly, without this Office being even notified prior to issuing.

We trust that the above information, although reflecting our own position, can be of some use to the committee. Our civil defense always has been able to create much interest due to the genuine cooperation of the city of Phoenix and Maricopa County heads of government.

Sincerely yours,

L. C. LEEVER, *Chief Deputy Director.*

DEPARTMENT OF CIVIL DEFENSE AND DISASTER RELIEF,
Little Rock, Ark., February 18, 1960.

Hon. CHET HOLIFIELD,
Chairman, Military Operations Subcommittee,
House Office Building, Washington, D.C.

DEAR CONGRESSMAN HOLIFIELD: Your letter of February 10 to Mayor Werner C. Knoop relative to the status of various aspects of civil defense locally has been referred to me for reply. First, I should point out that the city of Little Rock employed its first full-time civil defense director last July 1. Prior to that time, the little efforts that were made were accomplished with the assistance

of volunteer part-time directors. For these and other reasons, the following answers to the questions in your letter probably will not reflect the desired results:

1. To my knowledge, there are no home shelters within the city.
2. No public buildings have been modified for shelter purposes.
3. Our civil defense office does not have a control center of any type at present.
4. No underground structures, having a dual civil defense purpose, have been constructed in the city.
5. None of our public schools have been structurally modified to provide fallout protection.
6. Evacuation-reception centers have been designated for all of our public schools. These schools also have individual evacuation plans. I understand each reception center will accommodate the population of the school in addition to others. None of those centers, to my knowledge, are stocked with emergency supplies.
7. I believe that, if Federal policy could be changed to provide for title I FHA loans being available for the construction of fallout shelters in new homes as well as existing structures, interest in the construction of such shelters would be stimulated. I also suggest OCDM should make a survey of the downtown district and make recommendations as to the necessary structural changes in buildings for purposes of fallout protection. Federal fund have been obligated to the city under several applications for Government matching funds within the past 2 years and, for a combination of reasons, these funds are not going to be used for intended purposes. We have verbally requested OCDM, through the State civil defense office, to approve the use of the necessary portion of these funds in order to build a display model fallout shelter. I feel that, if this is approved, more interest in fallout shelters will be generated.

I am confident that, unless the Congress provides funds necessary to implement Public Law 85–606, the city will not have the funds necessary in the forseeable future to properly staff and equip our civil defense department. I feel that the Congress should either provide the funds to implement that law or repeal it. Certainly, there is no need for the law unless it can be implemented. If funds are provided I, however, wish to go on record now as opposing any Federal efforts to dictate their administrative uses for civil defense purposes.

I trust this letter will assist you and your committee in your civil defense study. I am well aware of your personal interest in the program.

Sincerely,

E. B. WARD, Jr.

STATE OF CALIFORNIA,
CALIFORNIA DISASTER OFFICE,
Sacramento, Calif., March 11, 1960.

HON. CHET HOLIFIELD,
Chairman, Military Operations Subcommittee of the House Committee on Government Operations, Washington, D.C.

DEAR SIR: Reference is made to your inquiry of February 10, 1960, addressed to Governor Brown, which contained specific questions on the influence of the Federal shelter policy on civil defense in the State of California. This letter was referred to me by Governor Brown for reply and an acknowledgment of such reference was made to your committee by letter dated February 25, 1960. I am pleased to forward now the data requested.

(1) Forty-four known; others, perhaps in somewhat greater number, are said to have been constructed. A few additional shelters are being constructed or planned.

(2) Eleven buildings are reported to have been modified to provide shielding from fallout.

(3) No. The California Disaster Office is organized with a State headquarters and six subordinate regional offices, arranged geographically to include the entire State. Preliminary plans of a general nature have been made to request necessary funds from the State legislature for the construction of a properly designed and equipped emergency operating center at each of these seven headquarters locations.

(4) Five. The number given relates to underground structures designed and constructed for dual purpose use, one purpose being shielding against fallout; a considerable number of other underground structures exist, capable of ready adaptation as shelters which were not constructed with shelter as an element of design.

(5) One. Although there is a reasonable awareness of need for shielding against fallout as related to schools, funding is peculiarly difficult for California school districts by reason of the general deficiency of funds necessary to keep abreast of ever-increasing need for classrooms.

(6) (*a*) In California 220 separate jurisdictions (counties and cities) in the support area have been designated as "reception points." Each jurisdiction is aware of this designation and knows its mass care capacity in terms of numbers of potential evacuees.

(6) (*b*) The emergency 200-bed hospital program: California now has 115 units in storage, of which approximately 60 are in designated reception points.

Emergency first aid stations: 670 units, of which approximately 300 are in designated reception points.

Emergency registration forms: Prepositioned throughout the State for easy transfer to all jurisdictions.

Except by accident of existing construction in isolated cases, there are no structures or buildings in the designated reception points which could be classed as shelters from radioactive fallout; hence, known protection against fallout is little. Reception points which happen to be in the path of fallout would have to be evacuated, and could not be used by evacuees until the radioactivity decayed to a tolerable intensity.

(7) Based on experience in dealing with local jurisdictions on the general problem of generating interest in building fallout shelters, a pattern of public and official attitude has become evident:

(1) The public generally does not have a full appreciation of the dangers inherent in potential nuclear war. There is a vast undercurrent of feeling that "it can't happen here."

(2) The public generally does not understand realistically the hazards of fallout and, to an even greater extent, is unaware of the fact that adequate shielding will save life.

(3) Local government officials are generally aware of the problem, but look to the State and Federal Governments for more aggressive and tangible leadership and example.

These conditions create a general public resistance to the current Federal "do-it-yourself" shelter policy. The policy is overly rigid, and lacks popular appeal. It is producing little in terms of accomplishments.

It would appear desirable and feasible that the national shelter policy be reexamined with a view toward the promulgation of a new policy to assure the attainment of an effective nationwide shelter capability. To accomplish this end, the following actions are recommended for consideration:

(*a*) Announcement to the public by the President that a national shelter capability in being is an essential part of the total national defense posture.

(*b*) Public announcements by the Joint Chiefs of Staff and the Cabinet in support of the President's position.

(*c*) The mandatory hardening of existing Federal buildings to provide shelter for employees and the visitors regularly therein.

(*d*) The mandatory inclusion of shelter in all new construction of Federal buildings.

(*e*) Construction of dual-purpose fallout shelters in federally operated recreation areas.

(*f*) Legislative action to provide subvention of funds to assist State and local governments in their public shelter construction programs.

(*g*) Tax relief to the extent of actual construction costs of shelters built by private industry, industrial and commercial organizations, and by families.

Sincerely,

H. G. ROBINSON, *Director.*

CITY OF LOS ANGELES,
OFFICE OF CIVIL DEFENSE,
Los Angeles, Calif., February 23, 1960.

Hon. CHET HOLIFIELD,
Chairman, Military Operations Subcommittee of the Committee on Government Operations, House Office Building, Washington, D.C.

DEAR CONGRESSMAN HOLIFIELD: Your letter of February 10 addressed to Mayor Norris Poulson was referred by him to me for reply.

Here are the answers to the questions which you submitted:

1. There have been approximately 10 fallout shelters constructed in the city of Los Angeles within the past 3 or 4 years. Building permits for

some of these have been issued by the building and safety department. We have reason to believe that a number of people have constructed shelters but have not designated them as such when taking out building permits. Some poeple do not wish it known they have constructed a shelter because of their concern over the world situation, or because they do not want their neighbors to know it exists.

2. Up to the present time, no public buildings in Los Angeles have been modified to provide shelter from fallout. However, the new Federal Customs House building soon to be constructed in the civic center area will have shelter potential in one of its subbasements.

3. As yet, the city of Los Angeles has not constructed an underground control center. However, consideration is being given to the erection of such a facility in San Fernando Valley. We do have a communications facility in Sangus which the mayor and the city council are now considering designating as an alternate seat of government. If this is done, a request will also be made that a fallout shelter capability be provided.

4. No underground structures having a dual civil defense purpose have been constructed in Los Angeles. We do have, however, an abandoned railway tunnel (former Pacific Electric right-of-way into the Subway Terminal Building) which could shelter some 8,000 people providing proper ventilation and exist shielding are provided.

5. No fallout shelter facilities have been provided in our public schools.

6. The city of Los Angeles does not advocate tactical evacuation. No evacuation reception centers have been prepared for use of evacuees from Los Angeles in the event the President requested a strategic evacuation movement.

7. The greatest deterrent to the construction of fallout shelters is the cost. The cheapest for which they can be built at the present time is $2,500. People are not willing to spend that amount of money for this purpose.

Obviously, the most important factor is to educate public officials and the people in the necessity of constructing shelters. Government at all levels should take the lead in this. The Federal Government should make it compulsory to provide fallout shelters in public buildings. Firms which do business with the Federal Government should be urged to do likewise. Some form of local tax incentive should be given the public to help induce them to build shelters.

Negotiations are pending between the city of Los Angeles and the Office of Civil and Defense Mobilization for a $200,000 shelter survey of every structure in the city.

Compared with what we have spent on offensive and active defensive weapons, the amount of money allocated for passive defense by the Federal Government has been negligent—niggardly.

Assumptions are made that a considerable number of the enemy's weapons loosed against us will be blunted and will not reach our shores. Everyone agrees, however, that some will break through our curtain of military defenses. At this point it would appear that planning stops. How do we protect ourselves from the weapons that do crash on our home soil?

The forces of civil defense are at a disadvantage compared to the military when struggling for appropriations from Congress for an obvious passive defense posture—such as the construction of shelters. Part of the problem is due to the fact that many people are complacent concerning passive defense measures or resentful when they contemplate going underground to save their lives.

It should be pointed out, however, that military services, in spite of an overall offensive policy, have throughout the ages, resorted to passive defense measures to assure their survival and the continuation or resumption of offensive means.

The second obstacle to a more effective civil defense program is the attitude that if the attack does reach our shores, we will die anyway and there is nothing we can do about it. This fallacious argument has been answered most effectively at previous hearings of your committee by eminent scientists and lay people, but it persists.

The question now arises—how effective is the Federal Government's national shelter policy? Have we given it enough time to unfold? Up to the present moment, the construction of family fallout shelters has not reached any appreciable degree of success.

It seems to me that your committee certainly can review all the factors involved. A public hearing would bring the Nation up to date on the shelter program.

Trusting this information will prove of value to you, I am,

Sincerely,

JOSEPH J. MICCICHE, *Director.*

SACRAMENTO AREA CIVIL DEFENSE,
Sacramento, Calif., February 19, 1960.

Hon. CHET HOLIFIELD,
Member, House of Representatives,
Washington.

DEAR CONGRESSMAN HOLIFIELD: Your letter of February 10, 1960, regarding your Military Operations Subcommittee's study of civil defense with special reference to the shelter program, was referred to this office by James B. McKinney, mayor of the city of Sacramento. I will number my replies to correspond to your questions:

1. To my knowledge no home shelters have been built within Sacramento County; however, considerable local interest has been shown. The local architects and homebuilders have been furnished with the Federal Office of Civil and Defense Mobilization publication MP–15, "The Family Fallout Shelter" and other pertinent information.

2. No public buildings have been modified to provide shielding from fallout. Some local buildings have been labeled "shelters," but they should be more appropriately called refuges as they have no facilities for more than the most temporary use.

3. We do not at present have an underground control center, but do have an approved Federal project application to engineer such a center. It is the desire of this office to construct one of 10,000 square feet to house a staff of 125 persons.

4. There are no dual-purpose underground structures in this area.

5. No fallout protection has been incorporated in any of our public or private schools.

6. The State of California, working with the reception area counties, has designated reception areas. In some cases these areas have been partially prepared, but in no case have radioactive fallout shelters been provided. The prepared reception area capacity is sufficient to receive, but still is not prepared to adequately care for, our approximately 500,000 metropolitan area residents

7. Fallout shelters should be mandatory in all future Federal buildings to give the local population some indication of the necessity and Federal concern. Continued and repeated public pronouncements by high Federal officials as to the need, is advocated. Perhaps some Federal assistance in the construction of home shelters would also help. The people of this county are still not aware of the danger. They do not realize how much they could strengthen the Government's hand in international relations if they, the public, would accept the fact that they as individuals have some personal responsibility for their own lives, and did something about it.

Our governmental agencies are, to say the least, aware of their responsibilities and have, in the main, acted to assume that responsibility. But the public, in general, shrug off their responsibility with the statement, "It's too bad. The Government will take care of us." This attitude can only be overcome by repeated statements from the highest level of Government.

The Sacramento area civil defense office is a combined city-county office and has jurisdiction over the city of Sacramento and the unincorporated area of the county.

Sincerely yours,

KENNETH C. JOHNSON, *Director.*

CITY OF SAN DIEGO,
February 19, 1960.

Mr. CHET HOLIFIELD,
Chairman, Military Operations Subcommittee,
Congress of the United States, Washington, D.C.

DEAR MR. HOLIFIELD: In reply to your letter of February 10, 1960, requesting information on the construction of shelters for protection against radioactive fallout, we are pleased to answer as follows:

(1) We estimate that several hundred persons have provided shelters for themselves, usually below their homes where canyon lots have provided considerable space below the floor.

Only four persons have taken out building permits to build shelters; none within the past 2 years.

(2) One, a hospital.

(3) Our control center has two floors below ground, no windows, and the sides of the building are heavy poured concrete. The roof is inadequate. However, calculations indicate that radiation in this building would be reduced to one one-hundredth, on the basement floor, of its outside intensity.

(4) No.

(5) No.

(6) Reception centers have been designated. These do not provide adequate shelter against radioactive fallout, and are not stocked with emergency supplies.

(7) We believe that the Federal Government should set an example by first protecting its own agencies. We further believe that the Federal Government should finance all or at least the major portion of any public mass shelters.

From recent inquiries by local contractors, it seems likely that at least some of them will shortly offer tract homes with shelters built into them. We presently require that all shelters meet local building codes. The Federal Government's suggested shelters in the OCDM publication "The Family Fallout Shelter" do not meet requirements contained in our building code.

We have been dissatisfied with the national civil defense program since its inception. We feel that if the program is to be continued, Federal leadership in this field must be strengthened, and that the program must be implemented to a greater degree by Federal policy, plans and, most of all, by additional funds.

Goals must be established, and realistic programs and budgets adopted before a successful program can ever be expected.

Sincerely,

CHARLES C. DAIL, *Mayor.*

CITY AND COUNTY OF SAN FRANCISCO,
DISASTER COUNCIL AND CORPS,
San Francisco, Calif., February 17, 1960.

Hon. CHET HOLIFIELD,
Chairman, Military Operations Subcommittee of the Committee on Government Operations, House Office Building, Washington, D.C.

DEAR SIR: Your letter of February 10, 1960, addressed to the mayor of San Francisco, requesting information on seven questions has been referred to me for answer [questions deleted]:

1. None.
2. None.
3. Yes.
4. Not expressly built for this purpose. We do have four underground garages and an underground convention hall that are designated as shelters. There are 116 designated public shelters in buildings that would give protection from fallout.
5. No.
6. Not expressly for San Francisco. The State is in the process of organizing reception areas. No fallout shelters have been built in reception areas.
7. The President and the Congress by word and deed must make it abundantly clear to the American people that shelters are necessary. Civil defense officials cannot do this. As soon as the American people believe shelters are necessary they will be built.

Sincerely yours,

A. G. COOK, *Director.*

CITY AND COUNTY OF DENVER,
Denver, Colo., March 1, 1960.

Hon. CHET HOLIFIELD,
Chairman, Military Operations Subcommittee,
Washington, D.C.

DEAR MR. HOLIFIELD: The civil defense information you requested is set forth below:

1. Eighteen shelters have actually been inspected. This does not include certain new housing areas being constructed with built-in fallout shelters, or other

new homes where persons are given a choice of plans with or without these shelters. Building permits do not necessarily reflect the number built.

2. Three.

3. Yes. Under rocks and cement. This control center is located under the stage at Red Rocks Theater.

4. Yes. It is claimed that the May D. & F. parking garage could serve nicely as a fallout shelter. One is now being considered for the city and county of Denver.

5. This has been discussed, but is only in the planning stage at this time.

6. (*a*) Evacuation reception areas have been selected.

(*b*) These centers do not provide the protection they should.

(*c*) Food distribution centers have been considered. Medical supplies have been stockpiled in small amounts.

(*d*) We estimate 250,000.

7. All Federal buildings should have fallout shelters open to the public. Fallout shelters should be deductible for income tax purposes. Package foods, similar to C rations, with Government label, should be made available at reasonable cost.

Your very truly,

DICK BATTERTON, *Mayor.*

STATE OF CONNECTICUT,
MILITARY DEPARTMENT,
DIVISION OF CIVIL DEFENSE,
Hartford, Conn., February 19, 1960.

HON. CHET HOLIFIELD,
Chairman, Military Operations Subcommittee, Committee on Government Operations, Washington, D.C.

DEAR MR. HOLIFIELD: This refers to yours of February 10 addressed to Governor Ribicoff, and to the Governor's reply of February 18 in which he turned your request for information over to me for reply.

At this writing it is difficult to provide detailed figures in answer to the questions because the shelter program now being emphasized by OCDM has only been developed in detail at the Federal level very recently. However, in an effort to comply with your request, herewith are the best answers that can now be provided from information presently available. The answers are in the same chronological order as your questions:

1. A recent survey indicates that there are probably more than 50 home shelters which have been or are being constructed in the State as a result of the OCDM program. Every day additional locations of these shelters are reported to this office.

2. No information available.

3. The answer is "No." It should be said, however, that under the OCDM matching fund program, the legislature in 1959 approved funds on a matching fund basis for an underground control center. The plans were drawn and approved by OCDM, but had to be abandoned in 1959 for reasons of economy in overall State expenditures. Sixty thousands dollars of OCDM matching funds which had been deposited in the State were returned to the Federal Government in the fall of 1959.

4. No information available. There has been very little underground construction in Connecticut, although there recently have been several inquiries from various locations in the State asking for detailed information about dual-purpose underground construction.

5. There are a number of schools in the State which have underground facilities for fallout protection. Some of this construction, however, was undertaken prior to the shelter program initiated by OCDM. We do have a very large project in the State at this time; namely, a new high school in Hartford. It is a building to accommodate 2,500 pupils which will have a dual-purpose cafeteria-shelter. OCDM is participating in the construction of this underground fallout shelter with a ceiling limit of $125,000 for OCDM participation.

In addition to this, it is known that at least three other towns in the State are now giving active consideration to dual-purpose shelters in new construction or on the modification of present buildings.

6. Since the beginning of civil defense in 1951, Connecticut has always had a large number of evacuation-reception centers available. It cannot be said that a great deal of special preparation has been undertaken in these centers. How-

ever, it is considered that most of them, which are located in churches, schools, Grange halls and other similar types of buildings lend themselves easily available for reception purposes without special preparation. Such centers, particularly in facilities where kitchens exist—are stocked with small amounts of food supplies, and in the larger installations there are limited first-aid facilities. Since most of these reception centers are located a safe distance away from critical target areas, and are in the basements of buildings, it is considered that they provide moderately effective protection from fallout.

Connecticut has tentative arrangements with the State of Massachusetts for movement of approximately 70,000 evacuees from Connecticut to Massachusetts where similar reception facilities are available.

A further point which should be considered in answering this question is that in preparation of the Connecticut survival plan which was approved in September of 1958, there was a survey of available basement refuge throughout the State made. This survey was conducted making a 25 percent sample coverage of facilities listed throughout the State. The net result was that Connecticut could house its 2,450,000 people, the entire population in basement shelters when and if it should become necessary.

7. The answer to question 7 is money. Practically every public meeting, and at meetings of civil defense workers throughout the State, the great complaint is that the Federal Government and, particularly, Congress has not provided the leadership that is needed to warrant substantial monetary and planning participation at the local level. One of the great needs in Connecticut is passage, by Congress, of the funds to implement Public Law 85–606. It is believed that the chairman of the Subcommittee on Appropriations should be persuaded that these funds are essential to stimulate local civil defense activity and that his fears about the development of a political bureauracy at local level are unfounded because all personnel authorized under the provisions of Public Act 85–606 would come under the merit system. The great complaint locally is that if the Congress does not provide leadership at the national level then there is very little stimulus for local activity, because Congress has not set an example.

It is hoped the foregoing will assist your committee in its work.

Sincerely yours,

WILLIAM L. SCHATZMAN,
State Director.

OFFICE OF CIVIL DEFENSE,
Bristol, Conn., March 8, 1960.

Mr. CHET HOLIFIELD,
Chairman, Military Operations Subcommittee,
House Office Building,
Washington, D.C.

DEAR CONGRESSMAN: Replying to your recent inquiry from the Military Operations Subcommittee regarding the construction of shelters for protection against radioactive fallout.

Answering your specific questions:

1. Perhaps 8 or 10 shelters. Building permits show no construction of home shelters.
2. About 25, all marked with signs for public use.
3. Yes. John J. Jennings School.
4. No.
5. No.
6. Winsted, Conn., is the evacuation point from Bristol. Meager preparations have been made for food and fallout protection.
7. If the Federal Government would sponsor a thorough educational program down to the household levels. A great amount of good would result. The cellars of these millions of homes in this country are potentially good fallout shelters.

Yours very truly,

BRISTOL CIVIL DEFENSE COUNCIL,
HARRY C. POLHILL, *Director.*

HARTFORD CIVIL DEFENSE ORGANIZATION,
Hartford, Conn., February 17, 1960.

Hon. CHET HOLIFIELD,
Chairman, Military Operations Subcommittee,
House of Representatives,
Washington, D.C.

DEAR MR. HOLIFIELD: This letter is in answer to the questionnaire your office sent out, dated February 10, 1960.

1. Checking the building permits for the past 2 years, there has not been any applied for home shelters as such.

2. None have been modified, but areas in existing buildings have been posted and will be used as such if the need occurs.

3. Our control center at present is located in a firehouse above ground but in the near future will be located in an underground shelter that is to be constructed in our new Hartford Public High School.

4. There have been very few if any underground structures built in the city in the past 2 years.

5. There has been no structural modification made in any schools for shelter purposes as yet, but the new high school that is to be constructed will contain an underground shelter to house 2,500 people.

6. Evacuation-reception centers have been selected by the State office, and they have been notified of their responsibilities in case of a mass evacuation of this city to their area, but there has been no report that these areas are stockpiled or ready to receive these evacuees and give them adequate shelter. Some of these towns of reception do have written plans of operation, but beyond that nothing has transpired.

7. I believe if more emphasis were placed on a shelter program by the Federal Government, it would have a stronger effect on the lower echelons of government. Various laws and regulations have been passed by both Federal and State, but little authority is given to back them up. Certain requirements should be made and enforced to make the public more conscious of their responsibility for survival in case of an all-out attack. It is a difficult problem to overcome the apathy of the general public in regard to a shelter program within the home. It is unfortunate that so many people are still of the same mind, that it can't happen here. It is at a point now, wherever possible, all new structures whether private homes or public buildings, some type of shelter should be incorporated in the building, required by law and enforced. This type of approach has been spoken of by many, but I doubt if it will ever materialize. This requirement should be followed in all new Federal and State buildings and it should be carried beyond that.

Yours very truly,

THOMAS J. SHORTELL,
Director of Civil Defense.

OFFICE OF CIVIL DEFENSE,
New Haven, Conn., February 19, 1960.

Hon. CHET HOLIFIELD,
Chairman, Military Operations Subcommittee,
House Office Building,
Washington, D.C.

DEAR SENATOR HOLIFIELD: Mayor Richard C. Lee of this city, has requested I reply to your communication to him dated February 10.

The OCDM policy referred to in your letter has had the complete support of this office and has been effective in educating the people concerning the hazards of radioactive fallout and the need for shelter—if there is war. Many individuals have been convinced that this country can be attacked with nuclear weapons and that fallout would then cause many deaths which can be avoided by use of home shelters. At the same time, through sources other than OCDM, they have been thoroughly indoctrinated with the idea that no nation would dare attack us. For this and other reasons I will touch upon, few, if any, home shelters have been built in this community.

The President and the Congress and many members of the Armed Forces, have let it appear to the people that our power of retaliation is sufficient to prevent a probable attack. State and local governments have thus been influenced to hold civil defense expenditures to a minimum. Industry has followed the lead of government. Under these conditions, the people find it

difficult to understand why it is important for them to build home fallout shelters when government and industry make no serious effort to do so. As long as the man in the street believes, rightly or wrongly, that his elected leaders do not really and truly expect an attack, he is ready to gamble his life against $500 that it won't happen, and he doesn't consider it a real gamble, either.

Specifically, to answer your questions:

1. No building permits for shelter construction have been issued in 1959.

2–6, inclusive. No.

7. What changes do we suggest in Federal policy? In the main, we are in sympathy with Federal civil defense policy and plans. We suggest, however, the following subjects to be studied at the Federal level, and the current policy be reexamined in the light of those studies:

A. Should OCDM continue to imply that the people are in grave danger from attack at a time when public money is not being spent for fallout protection of Government personnel? Our national policy should be consistent. If the danger is real, the protective effort should be made right across the board.

B. If it is essential to the national safety to press for home fallout shelters, we suggest:

(1) That local governments be encouraged to eliminate the fee for obtaining a building permit for shelter construction, and waive property tax assessment.

(2) That the Federal Government consider income tax deductions to offset home shelter construction costs, or otherwise financially assist local government or individuals in the matter of construction costs. The building of prototype shelters is not enough.

C. The passage of Public Law 85–606 was a very constructive step. Failure to appropriate funds, however, has had serious local repercussions, and we urge Congress to appropriate funds for 606.

D. The inclusion of civil defense in the surplus property program has done a great deal of good. It has also done a great deal of harm because there is a strong feeling among civil defense directors that there is a great inequity in the administration of the surplus property program. We suggest that Congress make a thorough investigation of the entire surplus property distribution program with a view to simplifying procedure, increasing the utilization of surplus property within the fields of government (Federal, State and local), and decreasing the unprofitable sale to dealers of property which could be used in the nonmilitary defense; and to place civil defense in fact on a parity with State health, education, and welfare groups.

In connection with paragraph (1) above, we would add that as part of our effort to support OCDM policy concerning the building of home fallout shelters, we erected on the busiest pedestrian corner of the city, a simple home basement fallout shelter, fully equipped. This was on display from September 1 to the 20th of December, 1959. From early morning to midnight, there was scarcely a time when someone was not inspecting the contents of this structure. Much of the time we had volunteers to explain and to hand out the Federal pamphlet "The Family Fallout Shelter." We distributed thousands of these. As a result, we had many inquiries in this office by person, telephone, and letter. Those who were interested asked two questions:

1. "Do I have to pay for a building permit?"
2. "Will my property assessment be increased?"

Our affirmative answer invariably produced an angry response and loss of interest.

If we can be of any assistance to you, please feel free to call upon us.

Sincerely yours,

ROBERT F. CORLEY,
Director of Civil Defense.

CITY OF NEW LONDON, CONN.,
February 26, 1960.

Mr. CHET HOLIFIELD,
Chairman, Military Operations Subcommittee,
House Office Building, Washington, D.C.

DEAR MR. HOLIFIELD: New London has benefited to a considerable degree, over the years, from the provisions of civil defense legislation. The chief

benefits have been in warning devices, shortwave radio communications network, fallout detection instruments, auxiliary police equipment, and other items affecting disaster operations.

In regards to civil defense home shelters, the public is generally apathetic. There has been a great deal of informative publicity, but little popular response. Cost and the trouble involved seem to be the chief impediments. There are aspects of fatalism in respect to consequences and the attitude "it will not happen here," in spite of continuous attempts at general education as to explosion and fallout perils.

The questions contained in your communication of February 10 may be answered as follows:

1. Officially none. There may be a few widely scattered family shelters, generally improvised.
2. None.
3. No.
4. No.
5. None.
6. Yes. No protection against radioactive fallout and no emergency supplies. The distribution is areal, by doubling population of homes, using industrial buildings, etc. Allotting shelter space will be slow and difficult.
7. The Federal Government should set an example for protection of its own and contingent personnel in Federal buildings.

A new armory (National Guard) is to be built in New London. Inquiry shows that no provision has been made for underground shelter or other fallout protection.

This is a terrific problem. The public does not comprehend its full implications. People in general do not believe that there will ever be an all-out atomic attack and, if it comes, they seem to think there's little that individuals can do about it.

Our State is working hard to put over an adequate civil defense program but there's no "eagerness" on the part of the people.

I believe that the Federal Government should be more emphatic in its civil defense attitude to convince the people of the reality of the perils facing them.

Very truly yours,

WILFRED A. PARK, *Mayor.*
By CHARLES T. SENAY,
Assistant Director, Civil Defense.

CITY OF WILMINGTON, DEL.,
OFFICE OF CIVIL DEFENSE,
February 24, 1960.

Hon. CHET HOLIFIELD,
Chairman Operations Subcommittee,
House of Representatives, Washington, D.C.

DEAR CONGRESSMAN: In answer to your letter of February 10, 1960, addressed to Mayor Eugene Lammot of Wilmington requesting information on the effects of the national shelter policy, I wish to submit the following at his request:

No. 1. Several shelters have been built in Wilmington. It is difficult to give the exact number; however, I would judge approximately 15. Most of these were built as a do-it-yourself project, therefore, would not reflect in the building permits issued.

No. 2. There have been no public buildings modified to provide shielding from fallout.

No. 3. The Civil Defense Agency of this city does not have an underground control center, however, plans are being drawn to include one in a proposed building that will house the Police Department, Farmer's Market and parking facilities.

No. 4. There are no underground structures having a dual Civil Defense purpose.

No. 5. There has been no structural modifications incorporated in any of the public schools.

No. 6. Evacuation reception centers have been selected for use of evacuees from the city in case of an emergency, they do not have adequate protection against radioactive fallout, and are not stocked with emergency supplies.

No. 7. I am of the opinion that if the following changes in the Federal policy were made it would reflect down to the lower echelons of government.

(*a*) That all new Federal buildings include adequate shelter space.

(*b*) All present Federal buildings be modified to include a shelter area as fast as it is feasible.

(*c*) That all new projects that are paid for in part with Federal funds include a shelter area.

If this could be accomplished I am sure it would stimulate the public into action, and aid the local directors to answer questions when asked what is our Federal Government doing about this at present our answer is "Very little if anything." If we could say that the Federal Government is including shelters in all of their Federal Buildings as mentioned above, it would make our job much easier.

Yours very truly,

PERRY M. GWALTNEY, *Director.*

GOVERNMENT OF THE DISTRICT OF COLUMBIA,
OFFICE OF CIVIL DEFENSE,
Washington, D.C., February 19, 1960.

Memorandum to: Commissioner Robert E. McLaughlin.
Subject: Civil defense information requested by Congressman Chet Holifield.

In response to your request for civil defense information requested by Congressman Holifield the following report is submitted [questions deleted]:

Question No. 1. The District of Columbia issued its first building permit for a home fallout shelter last week. The Department of Licenses and Inspections has established building permit criteria covering the types of shelters recommended by OCDM and private builders. No survey of home shelters has been made in the District. In the fall of 1954 a citywide survey of shelter areas was conducted under the direction of the Office of Civil Defense and as a result all available shelters in public and private buildings were identified and shelter area signs were posted to guide the public to these shelters.

One prototype home shelter is planned for construction soon under the OCDM shelter construction program for demonstration and other public action shelter programs in the District. Two 100-man group shelters are to be constructed, this spring, in the District. One such shelter in the headquarters building of the Veterans of Foreign Wars and the other in the headquarters building of the American Legion. Both shelters will be open to the public for demonstration and educational programs for at least 1 year after construction.

Question No. 2. Short of a new survey of all public buildings, all available information indicates that no public buildings have been modified to provide shielding from fallout.

Question No. 3. The Office of Civil Defense for the District does not have an underground control center. In the 1959 budget the Commissioners requested an appropriation of $6,000 to prepare plans for an underground control center.

Question No. 4. No underground structures having a dual civil defense purpose have been constructed in the District.

Question No. 5. No structural modifications have been made in public schools to provide fallout shelter. (NOTE.—This information has been checked with the Office of the Superintendent of the District of Columbia Ppublic Schools.)

Question No. 6. Evacuees from the District must rely on civil defense forces and facilities in Virginia, several counties in West Virginia and Maryland to provide for reception, shelter, and emergency supplies. The survival plans of these three States direct their support counties to prepare for this mission. Studies used in the preparation of these reception area plans indicate that sufficient numbers of housing units exist to care for the evacuees. Adequate shelter from fallout does not exist in these reception areas.

Question No. 7. Realistic and practical incentives must be employed to stimulate serious thinking and positive action about fallout protection by all concerned. The State of Maine, for example, has enacted legislation exempting the construction of fallout shelters from taxation as an improvement to existing property or as an additional room in new construction. Congressional appropriations should be made in support of fallout shelter construction in all new Federal buildings and to permit the modifications in the structure of existing Federal buildings.

The District of Columbia has made a concerted effort to make available to the public all of the information in its possession relative to fallout shelter protection. Thousands of copies of the family fallout shelter pamphlet have been distributed here. Every home in the District has received a copy of the "Guide for Civil Defense Action in the Washington Warning Area" which contains information on home shelters and essential survival items. Radio and TV programs have been devoted to the need for fallout shelters. Various fallout shelter exhibits have been setup including several at the current Home Show. It is expected that the three shelters programed for construction this spring, under the OCDM prototype shelter program will introduce fallout shelters to thousands of people in this area. The publication of the new national plan for civil defense is an added strength to local civil defense planning and operations. Congressional appropriations in support of national agency delegations programs, in support of the national plan, are providing a greater degree of direct assistance to the civil defense effort of the District of Columbia. The District urgently needs congressional approval of S. 2446, a bill amending the present outdated Civil Defense Act of 1950. This bill provides the Commissioners with the emergency powers needed to cope with major natural disaster emergency relief operations as well as the necessary emergency powers required following an enemy attack on this area.

GEORGE R. RODERICKS, *Director.*

STATE OF FLORIDA,
OFFICE OF DIRECTOR OF CIVIL DEFENSE,
Jacksonville, March 11, 1960.

HON. CHET HOLIFIELD,
Chairman, Military Operations Subcommittee of the Committee on Government Operations, Washington, D.C.

DEAR MR. HOLIFIELD: Your letter of February 10, 1960, concerning committee action with special reference to the construction of shelters for protection against radioactive fallout in event of enemy attack has been referred to me by Gov. LeRoy Collins, to furnish the information requested.

Replies to the questions set forth in your letter are numbered to correspond with the questions.

1. Approximately 7. Two of these have been used for habitability testing together with an organized information program to generate public interest in the characteristics and need for such construction. In addition, the Federal Government is constructing a prototype family type and two community type fallout shelters in the State as a part of its educational program.

2. No public buildings in Florida have been modified to provide shielding from fallout.

3. Florida's State civil defense agency does not have an underground control center, nor does it have a control center which provides effective protection against fallout. The only fallout proof control center in the State is in Dade County.

4. None. There are several parking garages which could be converted at nominal costs.

5. No.

6. Evacuation-reception centers have been provided for by the State and local survival plans in all counties. Organization and implementation of such centers varies from excellent to poor, with constant emphasis on improving our capability for the reception and care of the homeless in national disasters. Such centers are not stocked with emergency supplies, nor do they provide adequate protection against radioactive fallout, since fallout shelters have not been constructed or existing structures modified to include this particular feature. Our reception and care capability at this time, other than fallout protection, is approximately 1 million people. This capability would be heavily taxed should it become necessary to redistribute exacuees to uncontaminated areas.

7. The stated national policy is that "In event of nuclear attack on our country, fallout shelters offer the best single nonmilitary defense measure for the protection of the greatest number of our people." Realizing that adequate shielding is currently the most effective means of preventing radiation casualties, and that medical prophylactic and therapeutic measures to prevent death following exposure to large doses of radiation do not presently exist, the policy seems reasonable theoretically. The legislative policy with respect to carrying out the national shelter policy appears to be inadequate, since it is difficult to see compulsion introduced as a feature of such a program. For effectively shielding

against radiation, shelter should be provided for the normal populations of industry, business and commerce, schools, hospitals, institutions, Government and the individual at home. To bring this about will require added stimulus and assistance on the part of our national legislative body. Also, a shelter program to achieve maximum effectiveness must be geared to a program of providing the other ingredients of survival, including a controlled economy and the rapid recovery of services and systems.

Sincerely,

H. W. TARKINGTON, *State Director.*

CITY OF TALLAHASSEE, FLA.,
February 18, 1960.

Hon. CHET HOLIFIELD,
Chairman, Military Operations Subcommittee, House Office Building, Washington, D.C.

DEAR SIR: Your inquiry of February 10, addressed to the mayor of the city of Tallahassee, with respect to the influence of Federal policy on our local civil defense program has been referred to me for reply.

Going down your list of questions categorically:

1. We have had two inquiries from private individuals for shelter specifications that they might incorporate in residences that they planned to build. We have had no inquiries from subdivision developers or professional builders who are primarily responsible for the extensive home construction program that has been going on for the past few years. Yes, the information would be reflected in their applications for building permits.

2. Public buildings modified to provide shelter from fallout? Only the most recently constructed building at the nearby Federal correctional institution.

3. Local plans call for the relocation of our CD control center in the Jefferson County Courthouse at Monticello, 27 miles distant, in the event of a real emergency.

4. We have no underground structures presently designated for CD purposes. We have several State capital, university and similar public buildings that undoubtedly have shelter potential. About March 1, we expect to initiate a city-wide survey, to be completed in about 4 months, which will give us an accurate picture.

5. We have in the past 3 or 4 years opened six new schools and have two more under construction. No consideration has been given to fallout protection. If anything, the modern, so-called functional design employed in these new school plants is much more vulnerable than were the old conventional school structures.

6. Tallahassee is a comparatively small target city (population 50,000) and is classed as at least a megaton prospect. A weapon of that caliber will utterly demolish the city. Our survival—and civil defense program—is based on the evacuation of our people to lesser communities 25 to 50 miles distant. We have 14 support counties on which we must depend.

In only one of these counties has any serious consideration been given to a civil defense program. In all other counties, including Thomas County, Ga., in which the regional civil defense headquarters is located, the county civil defense director, if one has been named, exists in name only, has no organization, no finances, and no official county support.

Recognizing that our survival depends upon these support communities, we have endeavored, within our financial limitations, over the past 3 or 4 years, to stimulate organizations in these counties. They have all been advised that their populations may be doubled on an hour's notice—and the sort of preparations needed—but no steps have been taken for evacuation-reception centers—much less for protection against radioactive fallout.

7. The answer to your No. 7 would require a sizable volume and any one individual's thinking would reflect his community or county and might not be applicable to another anywhere.

The survival of any community—Bugtussle, Ala., to New York City—during the first 24 to 60 hours of calamity, depends solely upon its local resources, ingenuity, and leadership. Their plan cannot be spelled out for them by Congress, Battle Creek, nor even their own State office. The responsibility at the grassroots level rests with local leadership and, legally, is the responsibility of the board of county commissioners.

Planning should begin at the county level. The operational area should be the coordinating of the several county plans and should disrupt as little as possible the county programs.

The State plan, similarly, should be the blending of the operational area plans, with as little as possible revision of the latter.

For my part, I am not sure that the Federal regional offices are justified. For all the purpose that they serve, they are an expensive luxury that "blot up" Federal funds before they can soak down to the grassroots where effective civil defense must germinate.

At the State level, the extent and realism of the program depends upon the capability of the staff personnel—and the State funds appropriated to match Federal money. In Florida, funds limit the staff personnel to six people, all competent, but by the end of the fiscal year they are looking under the furniture upholstery for pennies to pay postage and meet telephone bills.

In short, I am of the opinion that the "cart has been before the horse" all the time. The effort should have been to first stimulate a realistic and workable program across the Nation at the local level with a skeleton Federal organization to promote it. As the lower level programs were formulated, the higher level plans would evolve until we crystallized the broad, national plan.

Instead, the familiar pattern of Government bureaucracy has been applied. Planning is done at the top and passed down the line as assignments, policy announcements, or regulatory memorandums. Information and instructions are shipped out by the bale in the form of bulletins, circulars, tracts, or pamphlets—90 percent of which has little application to the specific local situation and 75 percent of which ends up in "file 13."

One of the most competent and dedicated civil defense regional staff members that I have met complained to me that, when the practice alert is called, the "general staff" assembles in the regional control center to "command the troops"—and there are no troops. That pretty well sums up the national civil defense situation—at least as it exists here in the Deep South, which Hitler referred to as "the soft, underside of the United States."

What I am trying to get over is: You cannot expect any recognition of the need for fallout shelters until you have stimulated a general awareness of the need of civil defense and that has not been done.

I must admit that the foregoing has been critical and I should not criticize unless I am prepared to make constructive suggestions. I have given a great deal of thought to this matter over the past 4 or 5 years and still see no solution. I can assure you that civil defense—and any shelter program—is stalemated in this area until there is some capable person employed full time to promote civil defense planning, handle recruitment, and supervise training in this area. And to bring that about, State funds must be adequate to put area workers in the field to kick some life into public thinking and get the dormant counties aroused.

It has been suggested that we forget about a civilian defense program and leave it to the National Guard or home guard to take over in the emergency. Having served in the National Guard and having two sons currently enlisted in it, I assure you that the suggestion is so much tripe. The National Guard organization is not capable of doing the job that would have to be done and would be of greater service to the country otherwise employed.

Nor can the emergency be met by setting up quasi-military officials in each county to organize the local program and assume command in an emergency. He would have to operate under Federal policies and orders regardless of their local effectiveness. For example: The U.S. Department of Agriculture is assigned to the job of feeding the people in national emergency. The U.S. Forest Service is a department within the USDA—and are notified that their job is to help feed the people. Locally, the Forest Service doesn't own a cow—beef or milk—nor plant a row of turnip greens. But they are a first-rate rural firefighting force and are so organized in our Florida Capitol Civil Defense operational area plan, regardless of their order from Washington.

Further, we still like to kid ourselves that we are a democracy and that Mr. Average Citizen is still his own boss and has a part in running the country. He would grumble about having to support another local Federal agent, he would cooperate with that agent just as little as he wanted to, and when the emergency hit, he would help his elected sheriff, mayor, commissioners, etc., incarcerate the said agent for the duration of the emergency. I would do it myself.

In order to get the civil defense program off the ground and moving, the public must be aroused at the local level. In view of the prevailing apathy and indifference, local public sources are not going to provide the funds because there is no demand for funds for civil defense and more demands for other purposes than there are funds.

Someone must "prime the pump." Once the civil defense program is off the ground, it should be at least capable of generating matching funds locally. But, in the beginning, the funds must come from elsewhere and this undoubtedly must be from a Federal allocation.

It seems to me that the most constructive thing that Congress could do at this point would be to set up funds in some manner that they could bypass Battle Creek and regional civil defense offices to reach at least the State level, if not the county level, for the employment of local-help to organize civil defense.

Very truly yours,

WILLIAM F. JACOBS,
Administrative Civil Defense Assistant.

STATE OF GEORGIA, DEPARTMENT OF DEFENSE,
CIVIL DEFENSE DIVISION,
Atlanta, Ga., March 28, 1960.

Hon. CHET HOLIFIELD,
Chairman, Military Operations Subcommittee,
House Office Building, Washington, D.C.

DEAR CONGRESSMAN HOLIFIELD: With reference to your questionnaire dated February 10, 1960, concerning construction of shelters for protection against radioactive fallout in the event of a possible enemy attack, we sent to each local civil defense director in the State of Georgia a copy of your questions. There were 402 communities represented. Sixty-five answers were received, with the following results [questions delted; answers numbered]:

(1) 8.

Comment: This is a most difficult survey to make. There seems to be an unwillingness that verges on personal embarrassment to report the fact that a shelter has been constructed by the family. Indications are that there are a good many new homes that are including fallout shelters, and this is evidenced by accompanying photograph. (Photograph showing house under construction retained in subcommittee files.)

(2) 20.

(3) Yes.

(4) 4.

(5) 4.

(6) Approximately 200 reception centers have been designated; in most cases public buildings; none are stocked with emergency supplies; none provide adequate fallout protection. Reception centers in Georgia are set up on a 10,000-person capacity and these are broken into operational divisions for 2,000 persons each.

(7) 1. That some system of matching funds would assist.

2. That it should be mandatory for new construction and modification of existing structures.

3. Federal should build more model shelters to stimulate interest.

4. There should be more publicity with regard to the problems we are confronted with.

Comment: The above is a general summary of the 65 answers received. These answers, including several letters on this subject, are on file at the State civil defense office and will be sent to you upon request. In addition, while the shelter program has been in operation for some time on the national level, the full impact of prototype shelter construction, public information, and distribution of literautre is only now reaching the general public. We believe that the results are generally good, and many requests for the manuals on shelter construction are coming in daily. We hope to continue promotion of this program, and we tend to agree with the answers to the last question.

With best wishes and kindest personal regards, I am,

Sincerely yours,

GEORGE J. HEARN,
Major General, Director.

ATLANTA METROPOLITAN AREA OF CIVIL DEFENSE,
Atlanta, Ga., February 26, 1960.

Mr. JACK GRANTHAM,
Deputy Director, Georgia State Civil Defense,
Atlanta, Ga.

DEAR MR. GRANTHAM: In response to your communication of February 23, 1960, for the chairman of the Military Operations Subcommittee of Congress, the Honorable Chet Holifield, pertaining to shelters, we are glad to give you the following:

1. We know of only two civil defense home shelters which have actually been constructed. One of these is underground and the other was incorporated into a new residence. We know of a few instances where areas in existing residences have been converted to provide reasonably safe shelters.
2. To our knowledge no public buildings have been modified to provide shielding from fallout.
3. We know of no underground structures having a dual civil defense purpose, such as parking garages, etc.
4. No public schools hereabouts have been modified to provide fallout protection.
5. No evacuation-reception centers have been prepared in this community, and we have no knowledge of such preparations in adjacent reception areas.
6. It is our considered opinion that it will be necessary for the Federal Government to construct a sufficient number of shelters for the public to see that they are practical. A minimum of redtape as to the location and use of the shelters will greatly expedite public acceptance, we believe.

We hope this is the information desired by Congressman Holifield and his committee.

Sincerely,

ELLIOTT R. JACKSON.

STATE OF HAWAII,
EXECUTIVE CHAMBERS,
Honolulu, March 17, 1960.

Hon. CHET HOLIFIELD,
Chairman, Military Operations Subcommittee,
House Office Building,
Washington, D.C.

DEAR REPRESENTATIVE HOLIFIELD: Physical achievement in the fallout shelter program in Hawaii is being stepped up in view of increasing awareness of the hazard of nuclear fallout and interest in minimizing it.

Although we are faced with problems particular to Hawaii, we are making progress.

These problems are:

1. A majority of the State population resides in areas so close to the assumed aiming points for enemy attack that only uniquely massive shelters offer any great probability of protection.
2. Residential basements, so commonly used in effective shelter construction, are virtually nonexistent in Hawaii where most residences are of single-wall framed construction with exceptionally large areas of window space.
3. A large percentage of the population resides in areas where the high water table makes construction of submerged shelters difficult.
4. Local building costs are high. Professional estimates indicate the cost of building a federally financed prototype family shelter is over twice the maximum sum authorized for such construction.

In reply to specific questions presented in your letter:

1. No civil defense home shelters have been constructed in Hawaii.
2. No public buildings in the State have been modified to provide shielding from fallout.
3. Both the State Civil Defense Agency and the Oahu County Civil Defense Agency—within those territory Honolulu is located—have well-equipped underground control centers of massive construction.
4. No underground structures having a dual civil defense purpose have been constructed within the State.
5. Structural modifications for fallout protection have not been incorporated in any of our public schools.

6. Under the State operational survival plan, seven evacuation-recreation centers have been established on Oahu with combined capacity of 350,000 people. These centers, located with consideration of distance and prevailing winds to the target area, will operate as car parks with automobiles of evacuees serving as bases for dwellings.

(*a*) These centers are not stocked with emergency supplies, but emergency medical supplies, including first-aid stations and emergency hospitals are stored in closely adjacent areas.

(*b*) Planning conferences between local and Federal officials to establish emergency food stockpiles are in progress. These will be located to best support reception areas. Numerous small additional reception areas are located on neighbor islands.

Food stocks for initial sustenance for neighbor island shelters are available within each area but require early reinforcement by stockpiles not now in existence in the event of sustained occupation.

Mr. Holifield, the matter of minimizing the effects of enemy attack is a matter of grave concern to me and officials of our government.

In an attempt to analyze the factors serving to retard advancement of a sound shelter program, a staff study has been prepared by the director of the State Civil Defense Agency. This study concludes with specific recommendations regarding action I feel necessary to stimulate the program, including proposed action by government to accomplish it.

I believe that this study presents in analytical detail the situation in Hawaii as well as in mainland States. I enclose a copy of the study. (Study retained in subcommittee files.)

Plans for construction of a prototype group shelter in our State are well advanced and satisfactory conclusion of this project is anticipated.

I cannot urge too strongly that action be taken to make available Federal funds equal to the actual local cost of a prototype family fallout shelter so that this valuable item in the overall shelter program may be included in our local effort.

Maximum Federal funds now available are less than half of the actual cost of constructing such a shelter in Hawaii.

I hope that the statements above, with the enclosed staff study, will adequately reply to your inquiries. We count on your efforts, together with those of other dedicated officials, to realize accomplishment of a shelter program sufficient to provide sadly lacking protection of our State against radioactive fallout.

Sincerely,

WILLIAM F. QUINN,
Governor of Hawaii.

OFFICE OF THE GOVERNOR,
Springfield, Ill., March 14, 1960.

Hon. CHET HOLIFIELD,
Chairman, Military Operations Subcommittee,
Congress of the United States,
Washington, D.C.

DEAR CONGRESSMAN HOLIFIELD: The State of Illinois is deligated to present its views on construction of shelters for protection against radioactive fallout for reference use by your subcommittee. Specific answers to your letter of February 10, 1960, are contained in the attached survey. Some general views follow:

I am gratified to report that there has been a rising tide of public interest in this subject. Moreover, public information media in the State have demonstrated considerable support for this vital program.

Recently, my State civil defense director entered into arrangements with State and local homebuilders associations to encourage local builders to construct prototype shelters. The purpose is to induce homeowners to include such structures in new homes or alter existing dwellings to incorporate them.

Two top Presidential Awards have already been presented to Illinoisans for constructing exceptional home shelters and meeting other OCDM preparedness criteria.

Additionally, the Jaycees have launched a pilot project in Illinois wherein local chapters have pledged to build at least one fallout shelter in each community in order to spur this program and its adoption by homeowners. Also, the Amvets and other civic organizations are committing their membership

to similar projects. It is too early yet to forecast results of these various voluntary projects but initial reports have been highly encouraging.

The State of Illinois is proud of its progress in the field of civil defense. Within budgetary limits, it will continue to support the Federal shelter program and the national plan for civil defense and defense mobilization.

Sincerely,

WILLIAM N. STRATTON, *Governor of Illinois.*

STATE OF ILLINOIS CIVIL DEFENSE FALLOUT SHELTER SURVEY

(In response to letter of February 10, 1960, Military Operations Subcommittee of House Committee on Government Operations)

1. About 363 units are reported but we are certain a much larger number exist. Unfortunately, many homeowners who have built these civil defense units are reluctant to disclose their existence.

2. About 1,100 units. It is anticipated there will be an additional number as funds permit.

3. The primary control center for Illinois civil defense is located in the basement of the Museum of Science and Industry, 57th and South Shore Drive, Chicago. Development of an alternate control center at one of the following sites has been proposed: University of Illinois, Champaign-Urbana; Naperville, Ill., at an abandoned cave; and at University of Southern Illinois, Carbondale. Budgetary requests for construction of this center may be made when an appropriate site has been completely reviewed and engineering requirements established. In the meanwhile, the DuPage County control center at Wheaton, has allocated a control room to the northeast Illinois mutual aid area. Available as a temporary, alternate State disaster headquarters, this structure has been built to withstand 30 pounds per square inch blast overpressure and meets OCDM's rigid control center requirements.

Additional local centers, proposed or in process to link up with State civil defense headquarters, may be located at Waukegan, Joliet, Elgin, Skokie, Wheeling, Litchfield, Cherry Valley, Park Forest, and Rock Island.

4. About 320 units.

5. About 30 units. Special OCDM publications on fallout protection for schools are receiving wide distribution in our school districts. In this reference, it should be mentioned that a full-time civil defense liaison representative is maintained by the superintendent of public instruction, who most diligently handles radiological education and civil defense information.

This State has been a pioneer in the field of radiological monitoring instruction and has over 25,000 trained monitors. Under this program, approximately 1,500 free kits of radiological instruments were distributed and are being used for training. Radioactive sources were allocated to 16 designated localities in the State. A repair station for radiac instruments is maintained at Statesville Prison. St. Procopius College, Lisle, Ill., is preparing to calibrate instruments as soon as OCDM furnish cesium, now on order.

Additionally, Illinois Department of Public Health maintains three air stations monitoring atmospheric radiation at Springfield, Metropolis, and near Dresden. With some 7,300 radiation installations, this State must be constantly on the alert against any accidents involving this dangerous material.

6(*a*). None at present. Illinois survival plans provide for these centers but funds have not been made available by the areas concerned for implementing this portion of the plans.

6(*b*). No.

6(*c*). None presently. It is estimated that, when funds are available, reception centers required by the Illinois survival plan can be adequately set up on short notice and shocked with emergency supplies to accommodate evacuees resulting from nuclear attack.

7. It is believed that incorporation of fallout shelters in existing Federal structures, particularly in overpasses on highways built with Federal aid, should be accomplished or increased. Construction of fallout shelters with dual-purpose use should be encouraged.

It is urged that FHA mortgage provisions and income tax deductions for shelter construction be improved and publicized to the maximum extent possible and that homeowners be made aware of these benefits.

It has been suggested by engineers that added consideration be given to more practical designs for home fallout shelters at greater economy to the howeowner

and at minimum distraction to his normal living. Some investigation might be given to precast, reinforced cementacious plastic basement structures or other more economical construction materials which will provide greater tensile and compressive strength at less cost. Research in this field by appropriate Federal agencies might do much to advance the popularity of public, home and industry shelters, particularly if greater economy is effected in building costs.

STATE OF ILLINOIS,
CIVIL DEFENSE AGENCY,
Chicago, Ill., March 24, 1960.

Hon. CHET HOLIFIELD,
Representative from California, House Office Building, Washington, D.C.

DEAR CONGRESSMAN HOLIFIELD: In response to a call on March 22 from your assistant, Mr. Doug Dahlin, amplifying information on the recent survey and letter from Gov. William G. Stratton on "Construction of shelters for protection against radioactive fallout" follows:

General: Data assembled for this survey was secured mainly through sampling of Illinois' larger cities and areas. These figures were projected for the State as a whole. However, we believe there are many more shelters which have been constructed by informed and enthused people and industries which are still unreported to this office.

While it cannot be assured with exactitude that all units mentioned in this survey conform to OCDM's rigid standards, their construction undoubtedly would materially assist in casualty reduction.

Specific:

1. Three hundred and sixty-three is an approximate conservative figure for home shelters. We believe this can realistically be multiplied several times since many individuals building home shelters have not advised this or local civil defense headquarters of their action. Only this past month, Home Builders Associations in Illinois have agreed to support the fallout shelter program. A number of builders are now actively constructing prototype shelters in new dwellings for sales promotion purposes.

2. About 1,100 units. These are mainly hotels, utility, and industrial buildings which have made some modifications for light fallout shelter.

3. This is explicit as written. Congressional appropriations could expedite this construction.

4. About 320 units. Chicago alone has about 100 underground structures consisting of garages, plant facilities, etc., which have already been converted to bomb shelters. Some need modifications to meet updated fallout engineering requirements. The Chicago Tribune and Lakeside Press bomb shelters are only a few notable examples of these.

5. Thirty units represent an estimate of schools which have requested or built bomb and/or fallout shelters in basements of existing or new structures. The figure is a conservative approximation.

6. Federal assistance could help this program along.

7. It is believed that greater publicity given to Federal agency incorporation of shelters in their buildings, as well as the actual construction of desired prototype shelters at Federal expense in Illinois, will attract greater attention and urgency to as well as support for the shelter program in this State.

Sincerely yours,

ROBERT M. WOODWARD, *Director.*

CITY OF ROCKFORD, ILL., *February 17, 1960.*

Hon. CHET HOLIFIELD,
Chairman, Military Operations Subcommittee,
Committee on Government Operations,
House Office Building, Washington, D.C.

DEAR SIR: In answer to your letter of February 10, here are the answers to your questions:

1. We have no civil defense home shelters in Rockford.
2. No public buildings in Rockford have been modified to provide shielding from fallout.
3. The local civil defense agency has no underground control center.
4. We have no underground structures with a dual civil defense purpose.

5. Our public schools have no structural modifications for fallout protection.
6. No evacuation-reception centers have been prepared.
7. At the moment I do not feel in a position to give an opinion on Federal policy.

Yours very truly,

BEN T. SCHLEICHER, *Mayor.*

STATE OF INDIANA,
DEPARTMENT OF CIVIL DEFENSE,
Indianapolis, March 30, 1960.

Hon. CHET HOLIFIELD,
Chairman, Military Operations Subcommittee,
House Office Building, Washington, D.C.

DEAR MR. HOLIFIELD: This will refer to your letter of February 10, 1960, to Governor Handley in which you requested data pertaining to the fallout shelter program in Indiana. The Governor has requested that I prepare this reply and forward directly to you.

First, I would like to commend Mr. Leo Hoegh and staff of the Office of Civil and Defense Mobilization on the excellent work they are doing in this field.

The shelter program in Indiana is gaining momentum steadily. Negotiations are underway for the new State office building, which will be completed in late 1960 to have fallout protection facilities to house approximately 6,000 people. The present State capitol building has been surveyed and has excellent capabilities toward fallout protection. The new city-county office building in Indianapolis is extremely interested in incorporating shelter facilities.

Many private institutions are in the process of planning radioactive fallout protection for their employees. To mention a few: The Indiana National Bank and 20 branch banks in Indianapolis, Ind. The First Federal Savings & Loan Association of Richmond, Ind., is constructing a new building with fallout shelter.

There has been no statewide survey made to determine the number of both private and public shelters in Indiana. However, we do feel the people are beginning to accept their responsibility in this matter.

A prototype family fallout shelter was erected in August of 1959 at the Indiana State Fairgrounds. This exhibit was manned by the staff of the Indiana Department of Civil Defense during the 1959 State fair. The public interest this created was beyond our highest expectations with over 75,000 interested viewers.

We feel the education of the public is of the utmost importance in civil defense measures. Vigorous action for a peaceful future will be achieved only when frustration and fear in the face of the unknown is no longer prevalent to the American people.

Sincerely,

JOHN W. MCCONNELL, *State Director.*

ALLEN COUNTY CIVIL DEFENSE,
Fort Wayne, Ind., March 1, 1960.

Hon. CHET HOLIFIELD,
Chairman, Military Operations Subcommittee,
House Office Building, Washington, D.C.

DEAR MR. HOLIFIELD: In reply to your letter of February 10, addressed to the mayor and referred to this office, we have the following information. Letters were sent with a return postal card enclosed, requesting the information you wanted. These letters were sent to every building contractor and architect in Fort Wayne and Allen County.

The report back from these people was that there has been no home shelters constructed in our area, nor has there been any public building modified to provide shielding from fallout. We have at present no underground control center, nor has there been any underground structures, having a dual civil defense purpose, been constructed in our city. There has been no form of structure modification incorporated in any of our public schools to provide fallout protection. Up to the present time, there has been no evacuation-reception center prepared for the use by evacuees from our city.

I feel that the Federal Government should have money available to cities that are willing to build fallout protection for their citizens. According to our recent survey, it proves that the people are not providing protection from fallout on their own.

Hoping that this is the necessary information you require.

Sincerely,

Capt. GREGOR H. KLUG, *Director.*

City of Indianapolis,
Department of Civil Defense and Disaster Relief,
Indianapolis, Ind., April 1, 1960.

Mr. CHET HOLIFIELD,
Chairman, Military Operations Subcommittee,
House Office Building, Washington, D.C.

DEAR MR. HOLIFIELD: Please excuse the lateness of this reply. Your letter was forwarded to me only yesterday.

I have attached a sheet of answers to the questions in your letter regarding civil defense shelter construction.

If we can be of any additional assistance, please notify me.

Very truly yours,

CHARLES R. BRODERICK, *Director.*

1. Approximately 12. This information is not reflected in building permits issued.
2. None.
3. No. Control Center is located 20 miles away from city of Indianapolis, in Danville, Ind. Structure housing control center is above ground.
4. No.
5. No.
6. Evacuation centers have been established. Centers do not provide protection against fallout other than existing structures. No modifications of said structures have been attempted. Emergency supplies exist in evacuation centers and adjacent surroundings, but none have been stockpiled.
7. Recently, the Office of Civil and Defense Mobilization sent a representative into our city and proposed the construction of several prototype fallout shelters. The suggestions proposed to put shelters in the downtown area which we will naturally consider the center of the target area. Our estimation is that this would not be a good policy due to the fact that the fallout shelters in this area would not be sufficient to withstand the bomb blast, and therefore, for all practical purposes, be useless for fallout shelters. Of course, we feel it would all be a gamble wherever such shelters were built in a target complex.

We suggest Federal planning approach the problem from a practical standpoint and that such shelters should be developed in the target complex supporting area and be built 20 miles outside the logical target area.

IOWA CIVIL DEFENSE ADMINISTRATION,
Des Moines, Iowa, February 18, 1960.

Hon. CHET HOLIFIELD,
Chairman, Military Operations Subcommittee of the Committee on Government Operations, House of Representatives, Washington, D.C.

DEAR CONGRESSMAN: Your communication of February 10, 1960, relative to civil defense and protection from radioactive fallout to Governor Loveless has been forwarded to this office for reply. May we take the liberty of replying to your questions numerically.

1. At this time, the known home shelters constructed in Iowa is nine. However, undoubtedly there are many more who do not report their action to this office. In the past several months, requests received by mail at this office for home shelter pamphlets has been tremendous and we have forwarded several thousand pamphlets in reply.
2. Agreements have just been completed for the construction of a 100-person shelter in the Veterans Memorial Auditorium in the city of Des Moines, Iowa. The Iowa State Fair Board contemplates the construction of a shelter so that the visitors to the State fair, numbering over 400,000, may inspect the type of shelter necessary for family protection.
3. Our civil defense agency does not have an underground control center, but plans are under consideration.

4. To our knowledge, there are no underground structures having a dual civil defense purpose in the State.

5. As far as we know, no public schools have fallout protection in the form of structural modifications.

6. The Iowa survival plan, developed under the direction and expense of the Office of Civil and Defense Mobilization, calls for the evacuation of six target cities, which are populated areas. Since the plan has been prepared, the technological advances of guided missiles and the speed of aircraft almost prohibits an evacuation of metropolitan areas. Under the survival plan, however, there are reception areas in the event time permitted, evacuation is put into effect. All reception areas will have an ample stock of emergency supplies, such as food, and 200-bed emergency hospitals. Under this plan, several hundred thousand people would have protection under ordinary enclosures.

7. While our experience in the Middle West on the interest of civil defense has been stepped up considerably in the last few years, it is our opinion that until Congress definitely takes a more realistic view of the importance and necessity, the people will not take the subject seriously.

In the last session of our State legislature, a new civil defense law was enacted and four additional bills were enacted to cover the necessity of continuity of government and relocation of government in the event of necessity. We feel that our State legislators now are accepting their responsibility and if we could enjoy the same confidence from the Congress of the United States, it is our opinion the people of Iowa will accept their share of the responsibility.

Sincerely yours,

C. E. "BEN" FOWLER, *State Director.*

OFFICE OF CIVIL DEFENSE,
POLK COUNTY-CITY OF DES MOINES,
Des Moines, Iowa, March 10, 1960.

Hon. CHET HOLIFIELD,
House of Representatives, Washington, D.C.

MY DEAR MR. CHAIRMAN: Mayor Reinhold Carlson of Des Moines, Iowa, forwarded your letter of February 10, 1960, on shelters to this office for an answer.

1. No record, because building permits are not required for basement shelters.
2. None. One in the development stage and probably will be constructed.
3. No.
4. No.
5. No.
6. No.
7. It would undoubtedly help if the U.S. Commission of Education took a strong hand in recommending that all future school buildings have fallout shelters included in their plans. Locally, there is little or no interest in the board of education.

Respectfully yours,

PHILIP R. WEAVER,
Director of Civil Defense.

THE STATE OF KANSAS,
Topeka, February 22, 1960.

Hon. CHET HOLIFIELD,
Chairman, Military Operations Subcommittee,
House Office Building, Washington, D.C.

DEAR CONGRESSMAN HOLIFIELD: In reply to your questionnaire of February 10, 1960, attached hereto, this is to advise that, in general, no large public buildings, including schools, or industrial plants, have constructed congregate shelters against fallout in the State of Kansas and very little has been done toward modifying existing buildings with such shelters in view. Many of our schools now being constructed and now on drawing boards do have cleared areas in basements and corridors which can be utilized to provide some degree of fallout shelter.

Hundreds of home shelters have been constructed in the State of Kansas, although at the present time there is no way of ascertaining the number until the Civil Defense Women's Division has completed issuance of the achievement awards and decals to women who qualify under the new national program for

having constructed and stocked fallout shelters. This program is underway at the present time in the State of Kansas.

Many thousands of homes have been constructed in recent housing developments following the single level, ranch type design so popular at the present time. For the past 3 years commercial firms have been advertising a package concrete shelter with a metal type top for these basementless homes. The package price installed is about $550. Literally hundreds of people have installed them, probably because of that fact that this State is in the so-called tornado belt. We do not have, however, any figures concerning the number.

My State director of civil defense advises me that in 1955, when the Office of Defense Mobilization had to certify an industrial concern for a tax writeoff, applications were made for such certification by some large Kansas industries to apply toward the construction of congregate shelters. The certification was denied. Under the present Federal appropriation for construction of prototype shelters, the State of Kansas is participating with the construction of a 1,500 person shelter in the Kansas City metropolitan area and smaller shelters in Topeka, Wichita, and Salina, the other target area cities.

Trusting this information may be of some general assistance to you, I am,

Sincerely,

GEORGE DOCKING, *Governor.*

CITY OF KANSAS CITY, KANS.,
February 19, 1960.

Hon. CHET HOLIFIELD,
Chairman, Military Operations Subcommittee, Committee on Government Operations, House Office Building, Washington, D.C.

DEAR SIR: Your letter of February 10 has been received regarding the study that is being made on civil defense in the United States by the Military Operations Subcommittee of the House Committee on Government Operations.

Our answers to your letter are as follows:

1. None.
2. None.
3. No.
4. No.
5. No.
6. To our knowledge, only on paper.
7. No answer at this time.

We trust this is the information you need and that it will be of some value to you in your study.

Sincerely yours,

PAUL F. MITCHUM, *Mayor.*

COMMONWEALTH OF KENTUCKY,
MILITARY DEPARTMENT,
Frankfort, March 25, 1960.

Hon. CHET HOLIFIELD,
Chairman, Military Operations Subcommittee,
House Office Building, Washington, D.C.

DEAR MR. HOLIFIELD: Reference is made to your letter of February 10, 1960, addressed to the Governor and referred to me for reply.

The Office of Civil and Defense Mobilization, under the guidance of Gov. Leo Hoegh, has been very active in their efforts to educate the public concerning the hazards of radioactive fallout.

The Federal policy has been of definite benefit to civil defense in Kentucky, in that it has created an awareness on the part of the citizens of the value of a fallout shelter program. However, more positive leadership from the Federal level is needed. For example, recently a new Federal Reserve bank was built in Louisville without any thought being given to the building of a fallout shelter in the lower level of the basement. It is a difficult problem to convince builders and contractors to follow in theory one line of reasoning and in practice another.

To answer your questions more definitely, I will take them in the order you used in your letter. [Questions deleted.]

1. Twenty-five home shelters have been built in Kentucky. At the present time, a basement-type home shelter is being built in the home of Dr. Frank Dickey, president of the University of Kentucky, Lexington, Ky., by OCDM. This

will be used as an example of what can be done by others. It should be pointed out, however, that on a much larger scale, personal actions have been taken to convert existing basements of private residences into fallout shelters. In many instances these shelter areas have been stocked with a 2 weeks' supply of food and water.

2. None to my knowledge.

3. The State civil defense agency does not have an underground control center.

4. No underground structures having a dual civil defense purpose have been constructed.

5. None, however, in several schools of modern one-floor construction, provisions have been made to utilize the basements of residences and stores in the school's immediate area for fallout protection.

6. Ninety of Kentucky's counties are preparing evacuation-reception centers. These include schools, churches, and public buildings. They are not being stocked with emergency supplies, due to lack of finances. The degree of protection from radioactive fallout varies considerably in the different counties.

7. If the Federal policy was changed to show more definite and positive leadership, by requiring all new Federal buildings to include adequate fallout protection in their plans and to require the addition of fallout shelters in existing Federal buildings, at least to the extent of providing protection to their occupants. There is no question that the biggest deterrent to an effective statewide shelter program stems from a lack of financing. Individual counties normally are not financially able to acquire the services of a competent full-time civil defense director and as a result no local leadership is available. In many cases, with adequate financing (possibly under Public Law 85–606 appropriations) the entire preparedness program in the State would be greatly developed. Except for a few strong counties and metropolitan centers where some local financing exists, the only major organized incentive being given a fallout shelter program is through the activity of the civil defense adult education program, and in this instance, the emphasis is on individual preparedness efforts.

Sincerely yours,

ARTHUR Y. LLOYD,
Major General, Kentucky National Guard,
The Adjutant General.

OFFICE OF THE MAYOR,
Covington, Ky., February 23, 1960.

Hon. CHET HOLIFIELD,
Chairman, Military Operations Subcommittee,
House Office Building, Washington, D. C.

DEAR SIR: In reply to yours of 10th instant regarding what influence the Federal policy on civil defense has had on our city. In this letter you propounded seven questions which I will attempt to answer before making any comment. [Questions deleted.]

1. We have no knowledge of any civil defense home shelters being constructed in our city. This information would be reflected in our building permits.

2. No public buildings in our city have been modified to provide shielding from fallout.

3. Our civil defense agency does not have an underground control center.

4. We have no underground structures having a dual civil defense purpose.

5. To the best of my knowledge, there have been no structural modifications in our public schools to protect against fallout.

6. The only centers so provided are in connection with our State civil defense setup. I know that these centers are not provided with adequate protection against radioactive fallout and doubt if they are stocked with emergency supplies. I have no knowledge of how many people they will protect.

7. I am of the opinion that no change in Federal policy at the moment is necessary to achieve greater fallout protection. It seems that matters are more of a local nature. We could, however, be supplied with more information regarding the means and necessity of providing this protection from this point and conduct the publicity campaign in our own areas to promote adequate facilities. Some Federal aid in the matter of engineering would be of great help. Of course, Federal financial aid would also be of

assistance but the financial problem is as acute on the national level as it is on a local level.

I am very sorry that most of the answers to these questions are in the negative. Our people, like most others, do not view the problem with as much alarm as the gravity of the situation merits.

We can only achieve the ends that your committee is seeking by a prolonged program of education and only hope that it will not be too late. I would appreciate any information you can furnish me in regard to this matter.

Assuring you of my own full cooperation and apologizing for conditions as they now exist, I am,

Sincerely yours,

JOHN J. MOLONEY, *Mayor.*

LOUISIANA CIVIL DEFENSE AGENCY,
New Orleans, La., March 3, 1960.

Hon. CHET HOLIFIELD,
Chairman, Military Operations Subcommittee,
House Office Building, Washington, D.C.

DEAR CONGRESSMAN HOLIFIELD: Reference is made to your letter of February 10, 1960, addressed to the Governor of Louisiana, requesting advice as to the influence felt in the State of Louisiana as a result of the national policy and plans for the construction of shelters for protection against radioactive fallout in the event of a possible enemy attack.

The information desired by the subcommittee is furnished in the form of a general statement as to the influence the Federal policy has had on civil defense in Louisiana, followed by answers to specific questions.

A brief reference to special local conditions of geography which affect the shelter construction is necessary for an understanding of the shelter problem. The portion of the State bordering on the Gulf of Mexico and for about a hundred miles inland is low. The city of New Orleans is very thickly populated and is 5 feet below sea level. Underground basements in houses are practically nonexistent. It is practically impossible to improvise fallout shelters in this area of the storm cellar type which can be constructed in many parts of the country wheer soil and drainage conditions are favorable. Home building lots in this area are small and space does not exist for the construction of above-ground shelters in many of the homes.

The Federal policy governing shelter is published in annex 10 of the national plan. It provides for a program of information and education as to the need for shelter, a survey of the existing fallout protection available, a study of shelter design and a program of construction of fallout shelters. The program of information and education has been carried out by newspaper releases, radio and television announcements, and by distribution of civil defense publications. It has received publicity through the public school system in conjunction with the distribution of radiological instruments and radiological courses of instruction being given throughout the State. There has been considerable activity in the survey of existing improvised shelter. However, although the shelter program has the support of the State and local governments and the public, there has been little activity to carry out research or construction because of the lack of funds.

As for the construction of prototype family fallout shelters in the State, two cities, Lake Charles and Alexandria, have arrived at a point in negotiation with the Federal Government that they may be counted. The city of New Orleans has also forwarded a project proposal for a family fallout shelter.

No public buildings in this State have been modified to provide shielding from fallout. However, the city of New Orleans is negotiating for the conversion of a basement in the city hall for this purpose.

The Louisiana Civil Defense Agency does not have an underground control center. The city of New Orleans has an approved project for the construction of an underground control center at a cost of $375,000. The State plans to build an underground control center when funds are available.

No underground structures having a dual civil defense purpose have been constructed.

No structural modifications have been incorporated in public schools.

Evacuation reception centers have been planned for all parishes in the State of Louisiana which have been designated as reception parishes. In many cases, quotas of evacuees have been assigned to reception centers averaging in num-

bers the same as the population of the parish they serve. The reception centers are not stocked with emergency supplies and no special construction or shelter has been provided.

The average citizen is not in a position to judge whether the country is about to receive a nuclear attack or whether he really needs a shelter. The nonmilitary defensive action in cast of a nuclear attack will involve a combination of evacuation and shelter. In case of a large scale evacuation, reception parishes will need to provide shelter for approximately double their population. To get money to construct shelters from the parishes or the State at this time is not feasible. In general, the average citizen looks to the Government for defense whether military or civil. The threat of a nuclear attack appears to be one we must live with for a long time. If the threat is real, the nonmilitary defense should get more financial support.

Sincerely,

RAYMOND F. HUFFT,
Major General, State Director.

THE CITY OF BATON ROUGE
AND PARISH OF EAST BATON ROUGE,
Baton Rouge, La., March 4, 1960.

Mr. CHET HOLIFIELD,
Chairman, Military Operations Subcommittee,
House Office Building, Washington, D.C.

DEAR MR. HOLIFIELD: The following are answers to the questions you submitted in your letter of February 10, concerning the construction of shelters for protection against radioactive fallout in connection with the Civil Defense program in our city:

1. None. City-parish ordinance requires the building permits for such construction be obtained (none have been).
2. None.
3. We do not have an underground control center.
4. We have no underground structures with dual civil defense purpose.
5. Fallout protection in the form of structural modifications have not been incorporated in any of our schools.
6. Evacuation-reception centers have been selected for use by evacuees from this city in the event of emergency. However, such centers have been selected on the basis of existing facilities which would provide nominal fallout shelter capabilities. They are not stocked with emergency supplies. It is estimated that these facilities could only contain about 48,000 people. The protection afforded to them is highly questionable.
7. Federal policies should clearly define a program for protecting the local people. If this policy and program is the use of shelters as opposed to evacuation, then I feel the Congress should provide financial assistance, not only in the construction of fallout shelters but also to provide matching funds to share the cost of State and local expenses in the operation and maintenance of an adequate civil defense program.

Allow me to suggest that a statement of policy has been adopted by the American Municipal Association relating to civil defense, which is comprehensive in nature and represents the thinking of a large number of municipal officials. A copy of this can be obtained by writing Mr. Patrick Healy, executive director, American Municipal Association, 1612 K Street, NW., Washington, D.C.

Sincerely yours,

JOHN CHRISTIAN, *Mayor-President.*

CITY OF NEW ORLEANS,
February 22, 1960.

Hon. CHET HOLIFIELD,
Chairman, Military Operations Subcommittee,
House Office Building, Washington, D.C.

DEAR CONGRESSMAN HOLIFIELD: In answering your communication of February 10 requesting a summary of the influence the Federal fallout shelter policy has had in our local civil defense, it is important that a brief picture of our geographic and geologic situation should be emphasized.

As you undoubtedly know, New Orleans is located between the Mississippi River and Lake Pontchartrain with the majority of the population concentrated

in what could be described as an oval, with its axis extending northeast and southwest, within an area of approximately 300 square miles.

If we refer to the area of damage of the hydrogen bomb, having a burst equivalent to 10 million tons of TNT, by including the A, B, and C rings we find that approximately the same area is affected by a single burst. This is brought out to indicate why the basic principle developed in the metropolitan area survival plan was that of evacuation; particularly when we understand the especially high water table in the entire area which practically denies the possibility of going underground for shelter, either from fallout or the burst effect. However, I shall answer your questions paragraph by paragraph.

1. Although the news media for a good many months have been full of information concerning the construction of protection from fallout, the actual Federal policy on fallout shelter, accompanied by the information as to recommended types, was not received until the middle of November 1959. Therefore, there has been insufficient time to determine how much influence this will actually have on the population. During the last few years there have been very few protective shelters constructed by individuals at their residences. This number is insignificant. I also wish to bring out the fact that the types of shelter recommended under the Federal policy are unsuited to this type of country, as previously brought out.

2. At the present time there are no public buildings in this city which have been modified to provide shelter from fallout; although a survey is in the process and plans are being prepared for an 80-man fallout shelter in the city hall of the civic center. As soon as any information on fallout has been received it has been distributed to architects and construction companies throughout the city. Unfortunately, the new post office building, which is now under construction, had reached a state in its planning which prevented inclusion of fallout protection. Under the existing Federal policy of all Federal construction under the fiscal year budget of 1960 and subsequent years will include such provisions.

3. The Civil Defense Control Center, which has been utilized up to the present time, is located in the basement of the criminal courts building, is partially underground, and has served its purpose admirably in the training of staff personnel and during the natural disasters, which have fortunately been of short duration. The communication facilities with respect to the national warning system, warning point, the city siren alert system, the bell and light system and the Muzak outlets; some 12 radio nets, adequate landlines and teletype facilities, are fully developed and operational. However, for man-made disasters requiring the housing of personnel for any appreciable length of time it is totally inadequate. A new control center construction project is well along in its planning stage and we are now awaiting the final approval by the Office of Civil and Defense Mobilization prior to beginning actual construction. A total of $375,000 is the estimate, of which matching funds of $175,000 have been allocated both by OCDM and local government. When completed (which we hope will be in the fall of 1960), this emergency control center will meet every requirement of OCDM.

4. As brought out before, the number of basements in residences is negligible; and even in the newer buildings in the business section, while basements exist, they are mainly for utility purposes and would afford little shelter. A large project is in the planning stage for the building of a new international trade mart, and it is believed that there is the possibility of inclusion of an underground garage which, of course, could serve a dual purpose.

5. With regard to public schools, no structural modifications have been made to date for the inclusion of fallout protection. The school authorities, architects, and engineers have been furnished with all the necessary information to include fallout shelter in plans for future schools.

6. The parishes (counties) which have been assigned as the reception centers for New Orleans evacuees have been designated in the comprehensive plan for the actual reception, registration and care of the evacuees. This plan is now in a state of implementation. Inasmuch as these reception parishes fall under the control of the State Civil Defense Agency, we do not have specific information on this subject; however, specific provisions for fallout shelter and/or emergency supplies do not exist in these reception areas. With regard to the

construction of fallout protection in the reception areas, it is difficult to picture how a rural community could be made to feel the necessity for such construction, when it is realized that, in order to be effective from the New Orleans point of view, this shelter must house perhaps three times the normal population of the rural community. Local funds in such areas, generally speaking, are nonexistent Therefore, the financing of any such shelters would have to be practically entirely by Federal and State funds.

7. The question raised by the present forceful emphasis placed on fallout protection, is touched upon with some hesitancy. It has undoubtedly raised in the minds of a considerable percentage of the population, a false sense of security since the average citizen does not differentiate between protection from the burst—thermal effects—fallout. We have spent much effort attempting to indoctrinate the citizenry with the necessity for evacuation and feel that to some extent the present stress on fallout protection is decreasing the evacuation acceptancy.

I do not wish to give the impression that we are belittling the national fallout protection policy. We still feel, in spite of the perspective of reduced warning time, that our main hope for the survival of our population lies in evacuation. Therefore, we feel that greater emphasis should be placed on the necessity for an effective fallout shelter program in the reception areas.

Hope this information serves your purpose.

Sincerely,

DELESSEPS S. MORRISON, *Mayor.*

OFFICE OF MAINE CIVIL DEFENSE AND PUBLIC SAFETY,
Augusta, Maine, March 14, 1960.

HON. CHET HOLIFIELD,
Member of Congress,
House Office Building,
Washington, D.C.

DEAR CONGRESSMAN HOLIFIELD: Governor Reed has requested this office prepare a reply to your letter of February 10, 1960. I am happy to do so.

The national policy on shelter was announced by the Federal Government on May 7, 1958. The six action elements announced in the policy were specific and clear and appeared to reflect the best thinking of qualified individuals throughout the Nation in the matter of radiation protection. At the 1958 fall meeting of the National Association of State and Territorial Civil Defense Directors, the policy was discussed thoroughly. The State directors were all agreed that this was the correct approach to the problem.

This State has been as aggressive as possible over the past 3½ years in getting radiological information to the public. We are convinced our efforts are second only to California in the Nation. To accomplish this mission, we have relied heavily on the efforts of a dedicated college professor, Dr. Karl Woodcock by name, head of the department of physics at Bates College in Auburn, Maine. Two months each summer since, and beginning with, 1956, Dr. Woodcock has devoted full time to this instruction program. Protective measure (shelter) were included in this program.

When the national shelter program was promulgated in 1958 and distributed throughout this State, an additional impetus was provided to our efforts. When Governor Rockefeller announced the policy of New York State sometime last summer, to the effect that radiation shelter provisions would be incorporated by State law in all buildings, new and old, the State of Maine received an additional impetus to our program. In fact, an editorial from Life Magazine dated July 20, 1959, copy attached, was reproduced and transmitted to every legislator, head of State and local government, county and local civil defense directors and special advisory groups. The resultts were outstanding. Interest was at a high pitch through the summer and fall of last year and is still continuing.

However, the translation of public interest to actual physical results on the ground is another matter. Especially so, where the expenditure of money is involved. People in the State of Maine are not generally well off financially.

Now, to answer specifically the questions you have raised.

Question No. 1. Reference number of home shelters in the State of Maine: I am not trying to evade the issue when I say this is a most difficult question to answer. I have three pictures of one shelter constructed in Boothbay Harbor recently, in various stages of completion. When the family was first contacted,

the female member of the family insisted that this was a shelter for use in hurricanes only, and not for enemy bomb or missile action. In such cases, there has appeared to be some shame attached to a direct answer. It is possible there could be a reluctance to accept the possible additional taxation from increased property valuation. Other cases of known construction have indicated the family did not relish the thoughts of a flood of neighbors coming into their shelter under emergency conditions. My guess is that there are possibly 100 formal shelters built in this State. There are probably several hundred of an informal type where some basement preparation has been accomplished with sand bags available to cover basement windows. Several hundred individuals have requested information on the design characteristics and costs of home shelters. These questions have been answered by handout material received from OCDM, and such material is available in 16 county headquarters and some 531 local government headquarters.

Question No. 2. Reference Public building modified: No public buildings, Federal, State, county, or local governments have been modified to provide shielding from fallout as far as we know.

Question No. 3. Reference underground control centers: For the past three State legislative sessions (6 years) the State Appropriations Committee has not approved the request of this agency for funds to develop an underground control center. This, despite the fact that the Federal Government provides financial assistance on a 50–50 basis and so indicated in the request for funds. For some States, such as Maine, it may be necessary to offer greater Federal assistance by perhaps a 75–25 matching fund provision. Governor Hoegh would need some legislation to accomplish this, I believe, The $1 million of Federal funds set aside out of the present $10 million available for matching funds would probably not go very far on the 75–25 basis. I doubt if even this inducement would change the attitude of certain State governments. This State has been most liberal in providing funds, and in the 1961 session (biennium) there is a good possibility funds for this purpose will be provided. The State has provided funds to one county (Cumberland) on a 25 percent State, 25 percent county, 50 percent Federal basis for the construction of an underground control center for the Cumberland civil defense county staff at South Windham, Maine. Six bids were received recently, three of which were below our cost estimates. Federal (OCDM) approval has been received for this development to cost $149,500. This is the only such project in New England, to the best of our knowledge.

Question No. 4. Reference dual-purpose underground structures: None, to the best of our knowledge.

Question No. 5. Reference structural modifications for radiation protection in our public schools: None. To the best of our knowledge. Five superintendents from school districts have visited this office in the past 2 weeks on this subject. Those district schools contemplating expansion in the next year have been most interested. Four or five towns are involved, and local funds must be provided at town meetings currently in session. The question has arisen as to percentage support. This latter point is a matter your subcommittee could well investigate. School construction subsidies allow a percentage of Federal support, which I believe is greater than that available to OCDM (Governor Hoegh).

Question No. 6. Reference evacuation—Reception centers: None have been completed to date. One project, our first, has been approved for a development in Lewiston for the Salvation Army. At this point, another problem has developed. The Davis-Bacon Act has been introduced and at this moment OCDM is attempting to have some of the labor provisions of the act excluded up to $2,000 of the labor portion of the project. Small contractors shy away from any project which involves labor scales of the magnitude required under the Davis-Bacon Act. The pay scales in this State are much below the union labor quotations for use on Federal projects. At present, our policy has been to not accept any Federal assistance in the field of our effort. Accordingly, without Federal assistance with funds, the cost reverts to the community on a 100-percent basis. Generally, the problem is of this nature: Carpenters, $3.75 per hour where normally they work for $2 or $2.25 per hour; electricians, $4 per hour where normally they work for $2.50 or $2.75 per hour. No contractor of the scope of activity available in this State can stand the up-and-down pay scale policy. Your subcommittee might look into this matter. Whether the Davis-Bacon Act is constitutional or not is aside from the point. The fact

remains, we are confronted with a hopeless series of mitigating circumstances. Russia is probably ahead of the United States in the field of shelter provisions, as well as in other fields of development.

That completes the specific answers to six questions.

Question No. 7. General in nature: Until the Federal Government fully admits its responsibility in the field of civil and defense mobilization, it is extremely difficult for us here in the grassroots State and local levels of government to get much more than a similar "lip service."

Governor Hoegh, as Director of OCDM, has distinguished himself as an outstanding public servant dedicated to assist the States in a most difficult effort. The Federal Government passed Public Law 85–606 2 years ago, but for some reason an insignificant $12 million to implement has been denied by the Congress. This for two supplemental and two regular sessions. During the period July 1958 to July 1959, Governor Hoegh managed to hold qualified help in each State on the planning project practically singlehanded. This State has not recovered from the loss of the project staff ended June 30, 1959, and will never recover. Governor Hoegh knew this and did everything humanly possible to prevent the loss. The eight members this State engaged on the project are now all scattered. Two remain from the benevolence of an able Governor who provided funds from a contingent account good until July 1960.

Every new Federal construction project should require shelter provisions to be incorporated in the project. This is especially true for armories, post office buildings, hospitals, et cetera. Federal support for public schools must require shelter provisions in every new project or in every expansion of an old project. Governor Hoegh needs the full help of the Congress in support of his programs. He has a good program. Every program and action he has engaged in makes good sound sense. This includes the shelter program, the rural program, the home protection awards program, as well as the annexes now being prepared to support the national plan. When the Federal Government begins to give honest support to Governor Hoegh, then State directors can look for full support from State government. Until then each State has a problem.

To be more specific regarding necessary changes in Federal policy—or action, rather, since a policy which is not implemented will have little if any effect on public attitudes—a firm requirement, without exception, that all Federal or federally financed buildings, public or private, must have at least minimal clearly marked shelter areas as the primary need. This would give meaning to the OCDM's national shelter policy in a way that no amount of print on paper or words and pictures on radio or TV could, because it would show that the Federal Government actually believes that such protection is necessary, as it says it is.

Questions hard to answer for grassroots-thinking Americans: Why do we spend $1 million each day to store grains in a consolidated location in the West where a few well-placed bombs will obliterate 3 years of our national food supply when storage could be accomplished in each State at no charge under proper packaging; why does the Federal Government fail to implement Public Law 85–606 for a $10 million or $12 million cost included in an independent offices appropriation bill of $5 billion plus; why expect States to lead when leadership is or should be a function of Federal Government?

These are difficult questions to answer. Governor Hoegh needs real honest help and support. I believe he is not getting it. Until he does, the questions remain unanswered, and also provide moral support for our prime antagonist.

I have attached a copy of a previous letter pointing out the gratitude of one State director for your past support.

Sincerely,

WALTER H. KENNETT,
State Director.

ANNAPOLIS, MD., *February 26, 1960.*

MR. CHET HOLIFIELD,
Chairman, Military Operations Subcommittee,
Committee on Government Operations,
House Office Building, Washington, D.C.

DEAR SIR: Your questionnaire relating to civil defense addressed to our mayor has been referred to this office for reply.

1. To the best of our knowledge, no home shelters have been constructed within the city of Annapolis. No building permits for such construction have been issued within the past 5 years.

2. To the best of our knowledge, no public buildings have been modified as shelters against fallout.

3. In the Anne Arundel County Courthouse, located within the corporate limits of this city, a civil defense control center has been established on the ground floor level of the building. At its location in the building, however, it is fully below the ground level.

4. No underground structures relating to civil defense purposes have been constructed.

5. To the best of our knowledge, there have been no modifications, structural or otherwise, built into any of the local public schools.

6. The city of Annapolis has no knowledge, official or otherwise, of any evacuation-reception centers within the city.

7. It is our opinion that the flow of information from Federal agencies relating to civil defense is broken before it reaches the municipal level. The writer has filled the position of city engineer for almost 5 years and has never been contacted or received any directions from civil defense authorities at the county level. There have been infrequent civil defense tests during this time period, but no assignments have been made for any equipment or forces within the jurisdiction of our department.

It is our personal opinion that if a real danger exists, then some form of programing should be recommended in such manner as to reach our municipal level. If an emergency should develop here either in the form of local disaster or requiring the reception of evacuees from a disaster area, there is no plan making use of our municipal facilities or forces to meet it.

We trust that this information will be of some use to your committee. We shall be happy to supplement the above information if requested to do so.

Very truly yours,

J. M. AXELROD, *City Engineer.*

CIVIL DEFENSE ORGANIZATION,
Baltimore, Md., March 7, 1960.

Hon. CHET HOLIFIELD,
House Office Building,
Washington, D.C.

DEAR CONGRESSMAN HOLIFIELD: Your letter of February 10, 1960, addressed to Hon. J. Harold Grady, mayor of Baltimore, has been referred to this office for reply.

1. None (the first building permit issued for a shelter February 29, 1960). Building permits are not necessarily obtained when shelters are constructed on a do-it-yourself basis. This office has had at least 150 requests for literature pertaining to home shelters.

2. One—the Social Security Building in the metropolitan area.

3. Yes—in addition to the present underground control center, this office has planned and has submitted a proposal for a new control center located well outside of the metropolitan area. The present control center, although strongly constructed and underground, has certain limitations due to its location and size. It was constructed without the aid of Federal funds in 1951.

4. None—this office has proposed to OCDM that a prototype shelter be constructed in the new civic center which is being planned by the city of Baltimore. If this project is approved, this shelter would provide fallout protection for approximately 3,000 persons.

5. None.

6. (*a*) Yes—this office, with the cooperation of surrounding counties, has a complete evacuation plan including reception center areas.

(*b*) No—these areas do not provide protection against radioactive fallout except in the cellars of residential and other buildings to which evacuees would be directed.

(*c*) Our stockpile warehouses are accessible to all evacuation centers. They are stockpiled with emergency supplies except food items.

(*d*) The planned reception centers will accommodate 600,000 persons.

7. (*a*) The endorsement by the 86th Congress of a tax deduction program for home shelters on a 4 year amortization basis.

(*b*) That the Federal Government use its power and prestige to influence the several States and their political subdivisions that fallout shelters are in

effect like fire extinguishers and should not be subject of additional tax assessment to the home owner.

Very truly yours,

ARTHUR L. SHREVE,
Colonel, U.S. Army (Retired), Director.

THE COMMONWEALTH OF MASSACHUSETTS,
CIVIL DEFENSE AGENCY,
Natick, Mass., March 14, 1960.

Hon. CHET HOLIFIELD,
Chairman, Military Operations Subcommittee,
The House of Representatives, Washington, D.C.

MY DEAR CONGRESSMAN: Your letter addressed to Governor Furcolo of Massachusetts with reference to the construction of civil defense fallout shelters has been referred to this agency for reply direct.

I shall answer your questions by number as they were listed in your letter of inquiry.

1. The answer to this question must be an estimate. I should say approximately 45.

2. Some industrial concerns are making plans to incorporate some form of shielding protection within their structures. The First National Bank of Boston is building an underground structure in Pepperell (considered to be outside of the critical target zone) for preservation of its records. It is understood that space will be leased to other banks when the building is completed.

3. Not at this time. However, it is planned to build an underground control center for this agency during the current year.

4. None to my knowledge.

5. None to my knowledge.

6. None in Massachusetts. I have heard of none in other States.

7. Incentive should be provided for the construction of shelters in homes by legislation, both at Federal and State level, to make such construction tax exempt. Long term loans at low interest rates would do much to stimulate home shelter construction.

There have also been constructed in Massachusetts two prototype model shelters, one in Wilbraham and the other in Hyannis, for the purpose of public education. In both cases land and funds were donated by local people. Construction was based upon the plans and specifications contained in Technical Bulletin 5-3, a publication of the Office of Civil and Defense Mobilization. Efforts are being made by this agency to promote the building of others throughout the Commonwealth.

Very truly yours,

JOHN J. DEVLIN, *Director.*

CITY OF SPRINGFIELD, MASS., *March 28, 1960.*

Hon. CHET HOLIFIELD,
Chairman, Military Operations Subcommittee, House Office Building, Washington, D.C.

DEAR CONGRESSMAN: Referring to your letter of February 10, 1960, I wish to advise you in reply to the questions enumerated.

1. To our knowledge no home shelters have been constructed up to the present time, however, many of the family fallout shelter booklets have been issued, several of these to contractors. Some of these contractors were bidding on shelters for private homes in suburban communities.

2. Public buildings have not as yet been modified to provide shielding from fallout. A number of buildings, because of their construction, would provide means for fallout protection, particularly in basements.

3. Until recently the local civil defense agency had an underground control center in private building approximately 20 feet below ground. It was necessary to move from this location and plans have now been made to relocate this center in a city owned building. It will not, however, provide the protection afforded at the previous location, but should provide a shelter from fallout.

4. The only structure that has been erected has been at Smith & Wesson, Inc. Following the war they developed underground facilities for the continuance of underground manufacturing, in case of emergency.

5. No structural modification has been incorporated as yet in any of the public schools to provide protection against fallout. However, some of the schools are so constructed that a degree of protection would be afforded.

6. I believe some effort should be made to provide some fiscal assistance to the residents of these communities close to and effected by military installations. Obviously the cost of private shelter protection increases as location gets closer to probable ground zero. I appreciate the fact that under present planning, evacuation is called for. We do not however have any assurance that there will be time to evacuate. Many homeowners are not in a position financially to cope with this serious problem. Therefore, it seems apparent that they will have to receive assistance to provide as good a protection as possible for their families.

It seems taht one of the greatest contributions which could be made to impress on the people the need for them to help themselves in the face of a possible emergency, is for the President to make an address over combined communications facilities. He should devote it exclusively to civil defense and impress on the people the need for seriously solving the problems of a family fallout shelter. Also, how vitally important it is to develop civil defense in all of its facets, as a deterrent to war.

Sincerely yours,

THOMAS J. O'CONNOR, Jr., *Mayor.*

CITY OF WORCESTER, MASS., *February 23, 1960.*

Hon. CHET HOLIFIELD,
Chairman, Military Operations Subcommittee,
House Office Building, Washington, D.C.

DEAR MR. HOLIFIELD: Your letter of February 10, 1960, regarding a study of civil defense in the United States, asked seven questions. I am happy to supply the following answers:

Answer to question No. 1: None.
Answer to question No. 2: None.
Answer to question No. 3. No.
Answer to question No. 4. No.
Answer to question No. 5: No.

Answer to question No. 6: Yes, reception centers have been designated. Reception centers do not provide protection against radioactive fallout. Reception centers are not stocked with emergency supplies other than 200-bed emergency hospitals. Reception centers will accommodate 200,500 persons as follows:

Gardner	30,000
Phillipston	3,500
Royalston	3,000
Winchendon	18,000
Templeton	16,000
Hubbardston	4,700
Milford	9,000
Southbridge	11,000
Athol	35,000
Brookfield	6,400
New Hampshire	63,900

Answer to question No. 7: That the Congress immediately establish the fact that a definite need exists for fallout shelters based on current intelligence reports.

That immediate legislation be enacted to carry out an intensive and adequate shelter program throughout the country, its territories and possessions.

That the Congress provide the necessary funds and authorize and direct the Office of Civil and Defense Mobilization as the agency to carry out to a successful conclusion this important project which involves the population.

That the Congress enact legislation which will impose restrictions on all projects involving Federal funds and Government contracts requiring the building of underground structures under or adjacent to expressways. Such structures could be used as congregate shelters against radioactive fallout and if necessary underground garages.

Government contracts awarded to manufacturers should require the recipient to provide adequate shelters for their employees and make such shelters available to the general public.

The department of civil defense and I as mayor of the city of Worcester are not unmindful that the time is not too far distant when warning time will be next to nothing in a missile era. Current planning assumptions indicate we may expect a one-half hour warning time only, once intercontinental missiles (ICBM's) and intermediate range ballistic missiles (IRBM's) become operational.

If continuity of Government is important in the postattack period, so too is "continuity of business and industry." The department of civil defense in the city of Worcester has inaugurated a program to encourage business and industry to make preparations in security, mutual aid, and fallout shelter protection to assure continuity of business and industry.

To further the efforts of an adequate civil defense, a pilot study was conducted to establish a method of determining Worcester's available and needed shelter facilities in a selected section of the city comprising 570 acres, and containing 6,625 families with a total population of 26,500. More than 200,000 pamphlets on fallout shelters, home preparedness instructions, and warning signals have been distributed through parochial and public schoolchildren, industry, hospitals, and civic organizations.

Sincerely yours,

JAMES D. O'BRIEN, *Mayor.*

CITY OF DETROIT,
OFFICE OF CIVIL DEFENSE,
Detroit, Mich., February 18, 1960.

HON. CHET HOLIFIELD,
Chairman, Military Operations Subcommittee,
House Office Building, Washington, D.C.

DEAR SIR: This is in reply to your letter of February 10 to Mayor Louis C. Miriani requesting certain information regarding the civil defense program in Detroit.

Replying to the questions as enumerated in your letter:

1. We have no way of knowing how many home shelters have been built in Detroit. Our building code requires a permit (at a very nominal cost), but we feel that the do-it-yourself aspect of the program results in many of the shelters being built without a permit.

However, an average of about 10 telephone requests per day for the booklet, "The Family Fallout Shelter," would indicate that there is considerable interest in the subject.

2. We have no record of physical modification to buildings to provide fallout protection. However, many requests have been received for inspections of buildings to designate the best existing protection from fallout.

3. Yes; 12,000 square feet of control center below ground, and an equal amount of space above ground for administrative activity. The building was specially constructed for civil defense at a cost of approximately $315,000, one-third of which was paid by the Federal Government.

4. Several underground parking garages have been built in recent years, but they were not designed, or originally intended, for dual-purpose use. Incorporating shelter features was considered at the time, but the additional cost was considered prohibitive.

5. Actual modification has not been made to any existing schools. However, there are 15 new schools on the drawing boards and fallout protection is being seriously considered in their design.

6. Approximately 300 evacuation-reception centers have been designated in southeastern Michigan to receive approximately 3 million persons in the event of evacuation. These centers would provide no more than ordinary protection against fallout, and to our knowledge no special provisions have been made to stock emergency supplies, other than the medical supplies stockpiled by the Federal Government.

7. The OCDM policy with respect to promoting fallout shelters seems to be well directed and as adequate as possible within their budgetary limitations. However, it is our opinion that a policy which requires homeowners, business places, and local government to build shelters at their own expense will never provide adequate shelter for even the majority of the people.

Most of the people will not build home shelters and a large number

cannot build them. The latter do not have the money; they do not own their homes; and landlords will not build shelters for them unless compelled to do so.

Likewise, most local governments will never spend money to build shelters; and, besides, local government in a reception area will not build shelters to protect evacuees from target areas against fallout.

The present OCDM policy may be as good as possible under present circumstances, but it will fall far short of ever providing for fallout protection for the Nation as a whole.

A voluntary shelter-building program will not provide adequate shelter, so, if shelter is necessary to survival, there should be a different approach. It looks, now, as though the echelon of government that is most aware of the imminence of the threat, and most responsible for the survival of the Nation, will have to do the job.

This indicates a Federal shelter-building program throughout the country. It will be very costly, but its cost must be weighed against the necessity for shelter and how much is worth spending to save the Nation.

On the subject of how the national civil defense program affects our city: Detroit has for many years supported civil defense to the extent of several hundred thousand dollars per year, because the city feels a responsibility to protect its people. However, other cities in this area are doing little or nothing about civil defense, yet they are participating in the matching fund and surplus property programs.

Whether they lag in civil defense because they do not believe in it, or because they think that what Detroit does will help their people, too, we do not know. But it is quite evident that Detroit is carrying a disproportionate share of the civil defense cost in this area.

Perhaps the answer lies in having the Federal Government contribute to the administrative cost of civil defense. This would help considerably, but it would not create civil defense in cities that so far have not seen fit to appropriate anything.

It may be that more firm direction by Federal authorities, supported by financial aid, is what is needed. But, at any rate, something is needed to get civil defense into every community.

Thank you for the opportunity to comment on these matters.

Yours very truly,

WILLIAM BRINKMAN, *Assistant Director.*

KENT COUNTY CIVIL DEFENSE,
Grand Rapids, Mich., February 19, 1960.

Hon. CHET HOLIFIELD,
Chairman, Military Operations Subcommittee,
House Office Building, Washington, D.C.

DEAR CONGRESSMAN HOLIFIELD: Your letter of February 10, 1960, addressed to the mayor of Grand Rapids, has been referred to the writer for answer. [Questions deleted.]

1. The records of the building inspector's office do not indicate how many shelters have been built in Grand Rapids. As regards home shelters, we have had many requests for the shelter booklet, by phone and by personal call, at the Office of Civil Defense. Many people, when asking for the shelter booklets, have advised us they were going to build home shelters. We are advised by various people that a certain percentage of the new homes that are being built have shelters in them. Within the past week, a local attorney requested a shelter booklet, and advised that he was going to construct a shelter in his home that would house 12 people. We have a pamphlet rack in the city hall and one in the county building, where hundreds of shelter pamphlets have been distributed. Based on our experience, we would say that a fair number of people are constructing home shelters. A prototype shelter will shortly be constructed in the city of Grand Rapids, and we feel sure that this project will add impetus to home shelter construction in this community.

2. In the atomic era, we made a shelter survey in the Grand Rapids downtown area, of all buildings of any consequence. As a result of this survey, we found that we had 32 buildings in downtown Grand Rapids

that would furnish shelter under atomic blast. These buildings would shelter 33,137 people in the downtown Grand Rapids area. At that time, 7 other buildings that were checked, with slight alterations, would shelter 2,000 additional people in the downtown area. To the best of our knowledge, there have been no alterations for shelter purposes in these buildings.

We are now advised by OCDM, in form letter of February 5, 1960, that there will shortly be distribution of a booklet entitled "Fallout Shelter Surveys: Guides for Architects and Engineers." These books, according to the advice received from OCDM, will provide architects and engineers with procedures and standards for (1) evaluating the fallout shelter potential of existing structures; (2) modifying structures from the standpoint of radiation shielding and habitability, as to improving their worth as fallout shelters; and (3) preliminary design of fallout shelters to be incorporated in existing or new structures. OCDM now has our order for two dozen copies of this booklet.

In 1959, Tulsa, Okla., conducted a shelter survey in the Tulsa downtown area, at a total cost of $74,000; $50,000 was contributed by the business leaders of Tulsa, and the city of Tulsa provided $12,000 and the county an additional $12,000. We have not seen copies of this survey, but we understand that they will be available. Under the 1950 census, Tulsa had a population of 182,740. The Grand Rapids 1950 census was 176,515. Grand Rapids is now estimated to have a population of approximately 200,000. We do not believe that $50,000 could be raised by subscription in Grand Rapids for such a survey. If the Federal Government is sincere about developing a good shelter program for the protection of the populace in large downtown metropolitan areas, for protection against fallout, we believe that the Federal Government should furnish some funds for such shelter surveys.

3. Grand Rapids, or Kent County, does not have an underground control center.

4. Herpolsheimer's, largest downtown department store, has a three-level basement, one level being used for parking cars. Capacity for sheltering is 9,666, allowing 6 square feet per individual. We believe that this is the only Grand Rapids downtown structure, of late construction, which furnishes such shelter. The civic auditorium in Grand Rapids was constructed some years ago, with no contemplation of present world conditions, has good shelter capacity for 3,820 people, based on 6 equare feet per individual.

5. No.

6. Under the national survival plan, reception centers have been designated for evacuees from Grand Rapids and Kent County in the event of an emergency. We do not believe these reception centers provide absolute fallout protection. However, we believe that most dwellings and buildings in these reception areas would offer a fair amount of fallout protection, but no general guaranteed protection. In connection with the reception centers under the emergency welfare services phase of the national survival plan, we in Grand Rapids and Kent County, in cooperation with the Michigan Office of Civil Defense, are in process of urging those responsible in the various reception areas in the 23-county complex of area II under the national survival plan, to start moving on a more realistic basis, as applies to reception and care centers in event of evacuation; as Grand Rapids is a critical target area and we are much concerned about reception and care centers.

In the above connection, on January 14 and 15 of this year, an emergency welfare services conference was held at the Manger Hotel in Grand Rapids, invitations having been extended to the directors of the county departments of social welfare, civil defense directors, and members of boards of supervisors' welfare committees in the 23 counties. We had a registration of 128 and representation from all of the 23 counties in the complex. The Michigan Office of Civil Defense is now in process of arranging a meeting on a more formulative basis with the welfare directors in the support counties surrounding Grand Rapids, and at a later date, meetings will be held on a two-grouping basis with the secondary support counties of the area complex, to further implement the reception and care program.

7. Grand Rapids, being a critical target area, we believe that it is absolutely essential that the Federal Government furnish funds for shelter surveys in at least the critical target areas of this Nation, particularly as ap-

plies to downtown areas. The Federal Government, through the shelter booklet, has encouraged the construction of fallout shelters. However, we believe that more stress should be put on this program by the Federal Government, even to the point of where the cost of building a home shelter would be a deductible item under Federal income tax. If this were done, we believe it would furnish a firm inducement for millions of people to construct fallout shelters. However, there should be a maximum amount set, we would say of approximately $500. Anything one wished to spend above this amount would not be deductible.

In the last paragraph of your letter you state, "We would be interested also in any other comments you may wish to make concerning shelter requirements in your city and the operation of the national civil defense program as it affects your city." We also believe that the Federal Government should recommend that necessary legislation be passed at the State and local levels to exempt shelters from real property assessment. Some may not take kindly to this suggestion, but any inducement that can be made to people to construct shelters should be made, in what many have termed the "Age of Peril." We all know that the human resource is our greatest resource, and every effort should be made to protect this great resource under the conditions in which we are all presently living. In my humble opinion, construction of shelters of all types are a great deterrent factor, but to make this deterrence effective, we should get on with the job.

We do not believe that shelter is the whole answer to the many problems facing civil defense. We believe that some people have the impression that with shelter, there would be no evacuation. Given reasonable warning time, we believe that evacuation may be possible on information received through channels. This type of evacuation, as you know, would be a strategic evacuation and, of course, there is always the possibility of tactical evacuation. It will always be necessary, after attack, to have remedial evacuation in countless areas. The city of Grand Rapids has evacuation signs on all of its 23 evacuation routes, and we are in process of placing evacuation signs on these routes throughout the county. Evacuation signs, in critical target areas, serve a dual purpose—they create an awareness of civil defense, and will also serve their prime purpose of direction.

Public Law 85–606 authorizes matching funds for administrative expense at the State and local levels, but Congress, since the passage of this law in August of 1958, has failed to appropriate the funds necessary to further implement this phase of the civil defense program. We believe that the Federal Government has a definite obligation to provide matching funds for administrative expense. Should we be so unfortunate as to become involved in a war, the Federal Government is going to rely heavily on the communities of this Nation. This being so, the cities of this Nation are an integral part of the national defense program, and it is just as much an obligation of the Federal Government to furnish funds under Public Law 85–606 for passive defense, particularly as applies to administration, the same as any other phase of national defense. Manpower is the key to survival. If we are not in a position to do the job from the administrative level and develop a greater operational capability, we will certainly be extremely weak as applies to the passive defense of this Nation.

It is necessary that the people at the local level be conditioned to accept basic civil defense principles, as well as to develop our administrative and operational capabilities, and we believe that you know that it takes funds to do the job. We have spent billions for defense, from the armed services level, and this is as it should be, but this Nation has spent pennies, by comparison, as applies to civil defense, which is most vital as applies to the civil population. Without a good reserve of manpower, outside of the military services, should we become involved in war, it would seem that the people that are to do the actual fighting, will not have the resource of the civil population to back them up, unless everything is done to preserve the civil population insofar as is possible.

Most sincerely,

DANIEL R. WATERS, *Executive Secretary.*

STATE OF MINNESOTA,
St. Paul, February 18, 1960.

Hon. CHET HOLIFIELD,
Chairman, Military Operations Subcommittee,
House Office Building, Washington, D.C.

DEAR CONGRESSMAN HOLIFIELD: To answer your inquiry of February 10, 1960, it is necessary to preface my reply with a statement I feel has a direct bearing on the development of a shelter program in Minnesota.

Shortly after taking office in 1955 I urged the adoption of an adequate shelter policy and program on a national basis with Federal participation as a part of the program. My interest in the shelter aspect of civil defense continues.

The announcement of the national policy on shelter by Governor Hoegh in 1958 while gratifying to me, is inadequate, in that the means to carry out the monumental educational program did not exist at that time nor does it at the present. While I personally feel Governor Hoegh and his staff have accomplished a great deal with the limited resources available to them, it is far from adequate. Education in the shelter program must be conducted on all levels and activity must be in evidence on each higher governmental level before action can be realistically expected on the lower governmental levels. Consideration must be given to the necessary timelag of translating education into action.

It is not enough that pamphlets are distributed, television and radio programs and newspaper articles appear supporting a program. Government itself must act. Until our State legislators see shelters incorporated in new Federal buildings and existing Federal buildings modified to afford fallout protection areas, they are unwilling to appropriate State moneys for this purpose. This is also true of officials on county and local levels. In their eyes the Federal program contradicts itself. Counties and municipalities look to the State for leadership and the citizen looks to local government in turn. There is insufficient direct Federal assistance to local, county and State governments to enable them to carry out their responsibilities.

To answer your specific questions:

1. We do not have an accurate count of how many fallout shelters have been constructed, since many people, fearing publicity, are reluctant to disclose this information. We have identified over 50 homes with shelters in Minnesota. This is only a fraction of those actually constructed, and an even smaller fraction of a fraction of the number needed. Some building contractors are, however, including a shelter in their new home construction.

2. None. Surveys have been made in existing State buildings to determine and mark areas that would provide adequate shielding. They are not supplied with provisions and supplies for extended occupany.

3. No.

4. None.

5. Yes. In two schools now under construction in the Columbia Heights, Minn., School District. A concerted effort is being made to incorporate shelters in other schools now being designed.

6. None. The Minnesota civil defense operations plan does not envision the development of such a facility for economic and practicability reasons. We have a more realistic and adequate evacuee reception program in Minnesota.

7. I am somewhat fearful that the current emphasis on shelter, which is one essential in appropriate civil defense actions, may be interpreted to be the only action needed. I invite attention to the programs of organizing local, county and State governments to operate in an emergency, the essential organization and training of tens of thousands of volunteers and the other manifold capabilities needed for an adequate and balanced civil defense in addition to the shelter program. To this end the Federal Government must provide funds to assist local, county, and State civil defense organizations in this effort, as was envisioned in Public Law 85–606 and is now part of the proposed Federal budget. I urge the attention of your committee to this question.

I have followed your leadership and interest in civil defense and congratulate you on the driving force you are giving to this field.

Sincerely,

ORVILLE L. FREEMAN, *Governor.*

OFFICE OF CIVIL DEFENSE, CITY OF MINNEAPOLIS,
February 25, 1960.

Mr. CHET HOLIFIELD,
Chairman, Military Operations Subcommittee of the Committee on Government Operations, House Office Building, Washington, D.C.

DEAR MR. HOLIFIELD: Mayor Peterson of Minneapolis has forwarded your inquiry of February 10 regarding the activity of civil defense in this community in relation to the building of shelters. I should like to qualify my reply to your report by saying that, first, it is quite obvious to both of us that the people of the United States are not as yet motivated to the need for home shelter. Locally, we are striving in every manner to bring to the attention of the public the necessity of a plan for self-preservation in the age of atomic attack capabilities, but only in isolated instances have we been able to make any impact whatsoever upon our citizens. The following answers your questions as enumerated.

(1) We have no way of knowing exactly how many home shelters have been actually erected in the area, however, there is evidence of a reasonable number. We have had considerable amount of inquiries and requests for assistance in this area and we have a building contractor who is specializing in home shelters. He is averaging about two a month which, of course, amounts to nothing in a population of over a million. We have several cases that have come to our attention of individuals who have basement rooms or have built their own outside shelters.

However, this activity is in the face of a rather concentrated program of education to the people carried on by my office. I am the director of both the city of Minneapolis and the county of Hennepin. In the city of Minneapolis, the population of 575,000 approximately, we have given out through organized programs, using industry, schools, organizations and so forth, over 1 million pieces of literature during the past year. This literature was carefully distributed and not handed out in any haphazard fashion. In both the city of Minneapolis and in the 39 communities in the county, the home preparedness program has been initiated and is receiving very good response from the people. In other words, the citizens of this community are being made aware of the need and do have a place to go to get assistance.

(2) To my knowledge, no public buildings have been modified to provide shield from fallout. However, a considerable number of buildings have designated their safest area for fallout shelter and one of the public buildings, namely the Federal Reserve bank, has been making necessary modifications to provide adequate fallout shelter.

(3) Our local civil defense agency does not have an underground control center. In a target area, we do not feel that an undeground control center would be of any great help. Under the Minnesota civil defense plan, the entire area of four metropolitan counties are organized into what is known as Unicom (Unified Command) Organization. The director of the city of Minneapolis is the commander, in the event of an emergency under the State law, of the total civil defense operations of this area in the event of a declared emergency. A Unicom staff has been designated and has reached a reasonable operational status. The control center for Unicom is located in a community 35 miles from the target area (Buffalo, Minn.). A high school building and a Reserve armory have been designated for this purpose. A communication center and a mobile van are kept at this control center operationally ready at all times. Each of the four counties also have a designated control center away from the target area. It is our belief that the command structure, as set up under this program which allows for a total utilization of all the capabilities of all the communities under a single command, is the answer to the problems of target complexes. We do not subscribe to the building of individual control centers in each of the target areas, for we feel that we will either have an opportunity to remove our populace from the Twin City community or will be forced to take cover and hope that the attack is not in the immediate vicinity and that we can resume emergency operations using our normal facilities.

(4) No underground structures, such as parking garages, have been constructed in the city.

(5) All of our schools, public and private, have for several years been drilling on either dispersal or going to shelter. Shelter in this instance again is the safest place in the school, but it would not afford other than the minimum protection in the event of fallout. However, I cannot comprehend the 90,000 schoolchildren of Minneapolis remaining in the area if a thermo-nuclear weapon

were detonated in the vicinity. It would be our desire to evacuate them to a safe area until the radiation hazard subsidided in Metropolitan Minneapolis.

(6) Under the Minnesota survival plan, the evacuees from the metropolitan area will be distributed throughout the State. The area outside the Twin City area and the Duluth target area has been designated as a mobile support area and divided into five divisions; three of which support the Twin City area; one, the Duluth-Superior area; and one, the Fargo-Winnipeg area. Arrangements have been made for the reception of evacuees in each of these areas. Each area consists of 10 to 15 counties and each county seat is a welfare reception center. The capability of each county for emergency feeding, clothing, and housing, has been determined and evacuees will be routed, populationwise, to the counties on the basis of their capabilities to receive. The fallout protection afforded in each of these counties will depend upon how much fallout protection has been carried out by county and city governments and by individuals in their homes. It is our hope that through the rural civil defense program, we will be able to educate the people of the small towns and the country in the dangers of fallout and the benefits of a protective shelter.

(7) I do not believe that a change in Federal policy is what is needed today to achieve an operational civil defense program. As a consultant to Governor Hoegh and as past president of the U.S. Civil Defense Council for the past 2 years, I think that I am as close to the problems of civil defense as anyone in this country with perhaps the exception of Representative Holifield. I am very close to Governor Hoegh's thinking and believe it to be sound, and I am sure that I have helped influence some of the Federal policy. I believe the fault today lies with Congress and the administration. The refusal of Congress last year to provide implementation for Public Law 85–606 has held back our civil defense program for at least the period that the funds are being denied. Unless we have know-how, competent and well directed civil defense authorities on the local level, we cannot possibly expect adequate programs. The alternate to this is a Federal program down to the local level which would merely add an extra echelon of Government and still would not eliminate the necessity for local participation. Fortunately, you are well aware of this and have made a splendid effort to rectify this situation in your several appearances in Congress.

I also believe that there is a more basic problem in civil defense and that is the reluctance of the administration to accept the need for a total all-out effort. The few little catch phrases that the President is inclined to drop here and there in some of his messages, are not sufficient to convince the people of our country that civil defense is a necessary part of our total defense. Industry, Federal agencies and the population as a whole will not accept their role in civil defense until they are convinced that it must be done and are directed, if necessary, by rule and regulation to comply.

This calls for all-out participation on the part of everyone involved. For example, I believe that every industry engaged in the defense production should be required to have an adequate civil defense plan as a prerequisite to their contract in the same manner they are required to have a plant security program. Adequate legislation should be passed to require fallout shelters in new construction, particularly those being financed with Government funds. There are many other things that could be done which would make the task of the State and local director much easier.

It is unfortunate that much of the criticism for civil defense usually finds its way to the desk of the State or local civil defense director. I believe I can safely say that Federal, State, and local civil defense authorities generally know and understand the problems, but we are working against tremendous odds without public acceptance or understanding. The people of our Nation look to the administration and Congress for guidance and leadership. Unless this leadership is forthcoming, civil defense has very little opportunity for success.

Please keep up the good work you have been doing in the behalf of civil defense.

Yours sincerely,

WALTER P. HALSTEAD, *Director.*

CIVIL DEFENSE AGENCY,
Jefferson City, Mo., February 18, 1960.

Hon. CHET HOLIFIELD,
Chairman, Military Operations Subcommittee,
House of Representatives, Washington, D.C.

DEAR REPRESENTATIVE HOLIFIELD: Your letter of February 10, 1960, to Governor Blair regarding the status of certain areas of civil defense in Missouri has

been referred to me for reply. While it is difficult to give specific answers to your questions, I will endeavor to provide you with my impression of the situation.

1. We have attempted to discover the extent of private shelter construction in the State through a series of polls, conducted mostly among city and county civil defense directors. Although we have succeeded in obtaining information on only a few private shelters, I feel certain that there are many more in Missouri. There is some indication that persons have built shelters and are somewhat hesitant to make the fact known. However, a number of general contractors in the State have, in recent months, taken an interest in shelter construction, and there is an excellent possibility that activity in this area will increase in the coming months.

2. There has been some discussion of the possibility of modifying certain public buildings in Missouri, but—to my knowledge—there has been no action taken to make this an accomplished fact. It is possible, however, that such action has taken place on a limited scale in smaller communities and that the State civil defense agency has not been notified.

3. The Missouri Civil Defense Agency does not have an undeground control center. There is a new $375,000 joint St. Louis-St. Louis County Control Center at Howard Bend in St. Louis County, and this will serve the State's largest metropolitan area.

4. While it has not been designated for civil defense purposes, there is a new underground parking garage that has been constructed in Kansas City that could, with little difficulty, provide fallout protection for many persons. Other than this project, I have no knowledge of other dual purpose structures.

5. Fallout protection has not, to my knowledge, been incorporated in public schools in Missouri. However, there has been active interest in this possibility in several areas. The St. Joseph School Board directed inquiries to this office and to the Office of Civil and Defense Mobilization in an effort to secure Federal assistance for such a project. St. Joseph is in the process of erecting several new buildings under the provisions of a recent successful bond issue election, and local school and civil defense officials felt that fallout protection could be built into such dual-purpose structures as gymnasiums, cafeterias, and classrooms. Federal funds were not available for the St. Joseph project, and this fact has apparently discouraged activity in this area because local school systems generally feel they do not have the resources to underwrite such projects on their own.

6. There are approximately four evacuation reception centers in Missouri, and these are designated by local civil defense units. These centers are located in State parks and natural protective areas such as large commercial and natural excavations. While none of these areas are stocked with supplies, they would provide good fallout protection for thousands of evacuees.

7. I feel that the Federal Government might advance the program of shelter construction by making it mandatory that such shelter be incorporated in all public buildings erected with Federal assistance.

This, I think, would serve the dual purpose of actually providing shelter and serving as an example to the general public. The citizen is more likely to take an interest in private shelter construction if the Federal Government demonstrates such an interest.

While funds have been made available for the construction of prototype shelters in some of our major cities, I feel that this program can be greatly expanded. The costs involved in such an effort would be relatively small compared with expenditures in other areas of Government activity.

Furthermore, it seems essential that funds be made available to implement Public Law 85-606. State and local civil defense organizations are seriously handicapped by their inability to have fulltime personnel to prosecute civil defense programs, and this legislation could provide vital impetus to our nonmilitary defense effort.

I am sorry that the information contained in this letter is of such a general nature, but we have no field personnel and it is difficult to keep an accurate index of all activities within the State. I hope, however, that my answers will provide some assistance to your committee.

Sincerely,

DEAN LUPKEY, *Director.*

CITY OF KANSAS CITY, MO.,
Kansas City, Mo., February 24, 1960.

Hon. CHET HOLIFIELD,
Chairman, Military Operations Subcommittee,
House of Representatives, Washington, D.C.

DEAR MR. HOLIFIELD: Your letter of February 10 to the mayor has been referred to me for reply.

(1) No record of home shelters, if any.
(2) No public buildings have been modified to provide shelter.
(3) We do not have an underground control center.
(4) No underground structures having dual purpose have been constructed.
(5) Nothing incorporated in any of our public schools for shelter.
(6) No evacuation-reception centers have been prepared for evacuees.
(7) The Federal Government should provide selling materials, both pamphlets and speeches, to appeal to the following:
(*a*) Architects and engineers.
(*b*) Financing agencies.
(*c*) Contractors and builders.
(*d*) Governmental agencies—Federal, State, county, city, schools (and other political subdivisions).
(*e*) Families presently owning homes and building homes.

These materials should be geared to cover the field from the smallest home to the largest building.

Sincerely,

HARRY A. EIB,
Director of Fire and Civil Defense.

ST. LOUIS OFFICE OF CIVIL DEFENSE,
February 24, 1960.

Hon. CHET HOLIFIELD,
Chairman, Military Operations Subcommittee,
House of Representatives, Washington, D.C.

DEAR MR. HOLIFIELD: I have been asked by Mayor Tucker to answer your letter of February 10, 1960. The following answers are placed in the same order as the questions asked in your letter:

1. To date no building permits have been issued for the construction of OCDM-type family fallout shelters. However, it is known that some people have increased the attenuation factor in their basements by blocking basement windows and other similar methods. Total number doing this is not known but the number is believed to be small. It should increase in the future due to expected increase in the educational campaign.

2. We have no knowledge of any modification of public buildings to increase shielding from fallout. However, to date a few have been surveyed to determine their existing protection factor.

3. St. Louis city and county have jointly constructed a modern underground control center at a cost of $300,000 for the building, plus $75,000 for equipment. City and county share was obtained through bond issues (as part of a larger comprehensive program). City and county share was equally matched by Federal Government.

4. No underground structures having a dual purpose have been constructed. Funds were requested but were not granted.

5. To date, no public school building has been structurally modified to increase fallout protection.

6. The State has designated evacuation-reception centers for evacuees from this city. It is believed that the preparations that have been made to receive evacuees differs greatly in the various localities. At this date, it is probable that only a small number of localities have completed their reception plans.

However, St. Louis (city and county) do not have the same interest as formerly in these reception centers since mass tactical evacuation is no longer contemplated. See further comment on this subject in concluding paragraphs of this letter.

7. The question is asked about changes in Federal policy to achieve greater fallout protection for the people of this city. The obvious answer, of course, is that a Federal multi-billion-dollar program to construct fallout shelters across the Nation would provide much greater protection.

A less expensive program, though less effective program, would be to provide some degree of subsidy for citizens constructing their own shelters. Another less expensive program would be some tax relief for those constructing their own shelters.

All of these programs are, however, very expensive and I do not believe that Mayor Tucker is in favor of any of them.

It is believed that these large sums could be better spent to increase deterrent capability and to provide better military defense to include an anti-missile weapon in the near future.

If a massive fallout shelter program is not to be undertaken, and it is not recommended, the question remains as to what the Federal Government can do to achieve greater fallout protection for the people of this city.

The first requirement is better military defense through adequate deterrent power and also through better military defenses. The latter needs more emphasis and more positive action than it has received in the past.

In the field of nonmilitary defense, the Federal Government (OCDM) can do more than it has done in the past with a rather modest increase in appropriations.

It can strengthen the civil defense organizations at the State and local level by providing macthing funds for personnel and administrative costs. In the last analysis, the plans for local government to function in the emergency are prepared at the local level and the education of the people is carried out primarily at the local level.

It can provide all or part of the funds that are needed to make a complete fallout shelter survey of the city (and, of course, the adjoining county).

It can provide more prototype shelters (only one is underway at present).

It can give assistance in building dual purpose shelters, such as parking garages.

In conclusion, it is desired to say that on June 29, 1959, the mayor approved a change in civil defense concept and plans to give up mass tactical evacuation and, instead, to rely upon the seeking of shelter (primarily against fallout) as the best means of saving the most lives.

Briefly, the reason for this change in concept and plans was primarily due to the advent of the ICBM which allows no time for evacuation.

Another reason was the recent installation of Nike-Hercules weapons around the St. Louis area which give a high degree of protection against the piloted bomber.

Plans for strategic evacuation under suitable conditions were retained as well as plans for limited postattack evacuation if required. Also the possibility of some spontaneous tactical evacuation is recognized but mass tactical evacuation is no longer contemplated.

Finally, it is desired to emphasize that a greater degree of immunity for cities from direct hits is needed and this can be provided only by better military defenses to defend against the ICBM as well as the piloted bomber.

This is needed because the mass of the people can no longer be evacuated. It is also needed because the industrial might of the Nation is mostly located in the urban areas where the people are.

It is believed that the fallout problem is manageable even without massive shelter construction because existing shelter especially in urban areas can, with modest improvements, be made adequate to save a high percentage of the people.

Sincerely,

F. P. HARDAWAY,
Director of Civil Defense.

STATE OF NEBRASKA,
Lincoln, Nebr., February 19, 1960.

Hon. CHET HOLIFIELD,
Chairman, Military Operations Subcommittee,
House Office Building,
Washington, D.C.

DEAR SIR: Your letter of February 10, addressed to the Governor of Nebraska, has been referred by his office to the writer for reply. The answers to your

questions will conform to the numerical pattern of your letter, and follow herewith:

1. One prototype family shelter will be dedicated at Grand Island, Nebr., on March 16. Another similar shelter at Auburn has been approved. With our present limited staff it would be impossible, as well as time-consuming, to obtain a report on all the shelters which have been constructed in the State. However, it is felt that the number would be surprisingly more than we anticipated. Obviously, not all shelters would conform to OCDM specifications, but all over the State people are writing in for information, and we have found them constructing shelters on their own. We are attempting to satisfy their requests as well as our restricted capabilities will permit.

2. To our knowledge no public buildings have been modified to provide shielding from fallout. We were told that the new post office building now being constructed in Omaha would have such a shelter, but recent newspaper releases have indicated the reverse to be true.

3. This agency does not as yet have an underground shelter. However, we are working on plans to submit an application to OCDM for phase I of such a project.

4. To our knowledge there are no underground structures having dual civil defense purposes. However, there are numerous structures of this type which could easily be converted. It will take education, training, personnel, and funds to make the local people see the advisability of such a venture. In many cases we have been asked to survey a certain structure as a possible shelter from tornadoes, which interest has been created, we believe, by our warning system which is available in natural disasters, and which is being used for that purpose. This, coupled with publicity on the subject, has created quite a considerable interest in that phase of public shelters.

5. In this age public schools are being constructed for the benefit and comfort of students and faculty, as well as architectural beauty. Little if any thought has been given to the construction of a shelter area. We believe that departments of education, from the Federal level on down, could do much to bring before local school boards the necessity of incorporating shelters in their buildings for the protection of those occupying the buildings. Local civil defense directors, who are on a volunteer basis, do not as a rule have the knowledge necessary to convince local building committees that shelters should be incorporated in school buildings. Some of these buildings we have visited do have certain areas adequate for shelter, but most of the modern school structures are not built with this in mind.

6. Three evacuation areas in Nebraska are in fairly good shape, with space designated for mass feeding and shelter on a temporary basis. Our plan calls for final dispersal of the population to individual homes, farms, etc., within the evacuation areas. Two other areas are in the process of making surveys of the situation at the present time.

7. What is needed in civil defense in this State is more personal work with local people. If the citizens have someone to show them what to do and how to do it, there are usually enough of them to see that the job is done.

We have one full-time man, with two secretaries, endeavoring to perform the State civil defense duties. The adjutant general, in addition to his duties with the National Guard, is the State civil defense director. He has been devoting a great deal of time to this program, for which he receives no pay. This small staff makes it impossible to do an adequate job. Additions to the State staff and even to local staffs are impossible, because of restricted budgets.

The greatest thing the Government can do toward building an adequate and effective civil defense organization, is to appropriate funds with which to implement Public Law 85–606. This would provide necessary funds for increasing State and local staffs, so that they could have personnel to visit with local people and show them on the spot how and why certain things should be done. Personal contact with local people at regular intervals is necessary, and this cannot be done with undermanned staffs. Fallout shelter problems, then, would become just one of the tasks to be accomplished. Publicity and education are needed, to be sure, but unless someone at the State and local level can be constantly and personally bringing the problem of fallout before the people, and train them to meet eventualities, their actions will undoubtedly be purely mental, with good intentions, but will not be carried out until it is too late.

We trust that this will give your subcommittee the necessary information.

Very truly yours,

AUSTIN S. BACON, *Deputy State Director.*

DEPARTMENT OF PUBLIC WORKS AND UTILITIES,
Lincoln, Nebr., February 19, 1960.

Mr. CHET HOLIFIELD,
Chairman, Military Operations Subcommittee,
House Office Building, Washington, D.C.

DEAR SIR: Your letter to Mayor Boyles has been referred to this department for reply.

You have asked seven specific questions which I will attempt to answer in the order you have asked them.

1. To our knowledge, only four home shelters have been built; however, other builders have considered such construction and possibly will include such shelters in homes where the owner will pay for the additional cost.
2. We know of no public buildings that have provided such shelters.
3. Our local civil defense agency is in the process of constructing an underground control center. It will be at least 1 year before it is complete.
4. There are several parking garages and other fire-resistive constructed buildings that have basements that would afford a certain amount of protection for such use.
5. To our knowledge, our public schools have not provided fallout shelters.
6. Evacuation reception centers and routes to reach such centers have been set up by our civil defense agency, but no construction of approved shelters has been provided.
7. Our civil defense agency has recommended to our city council and our county commissioners a five-point program.

It is my opinion that these five suggestions are reasonable; however, there is a legal problem involved which would have to be cleared up before definite action could be taken.

A copy of this five-point recommendation is attached.

Very truly yours,

E. A. VORHEES, *Building Inspector.*

RECOMMENDATION OF ADVISORY COMMITTEE TO CITY COUNCIL AND COUNTY BOARD AT MEETING HELD NOVEMBER 4, 1959, TO DISCUSS THE NEW YORK STATE REPORT ON PROTECTION FROM RADIOACTIVE FALLOUT

Action: It was moved by Mr. Allgood and seconded by Mr. Tyrrell that the advisory committee recommend to the city council and county board:

1. That there be an acceleration of the public information program covering the threat of radioactive fallout, devoid of technical terminology.
2. That we recommend that the city and county consider requiring fallout shelters prior to approval of building permits in all areas of new construction in which persons are customarily present.
3. That we encourage that existing structures be altered to provide for shelters, in keeping with building standards set by the Federal Government (see MP 15 attached) and enforced by the building inspector's office or its county equivalent.
4. That any such shelters not be assessed for property taxes.
5. That building inspection fees on shelters be on a nominal basis without regard to cost of structure.

The motion was carried unanimously.

OMAHA, NEBR., *February 25, 1960.*

Hon. CHET HOLIFIELD,
Chairman, Military Operations Subcommittee,
House Office Building, Washington, D.C.

DEAR CONGRESSMAN HOLIFIELD: I am replying to your letter of request relative to the shelter program as advocated by Leo Hoegh, Director of the Office of Civil and Defense Mobilization.

1. We are unable to determine the number of civil defense home shelters which have been constructed in Omaha. Although permits for such construction should be obtained from our permits and inspections division, it is very possible that such work has been done by homeowners or small contractors without first having obtained the required permit. I rather suspect this is the case as our office of civil defense has distributed several thousand home-shelter booklets to individuals and has also sent out large-scale drawings of home shelters to individuals and to contractors.

2. To my knowledge, no public buildings in Omaha have been modified to provide shielding from fallout.

3. Our local civil defense agency does not have an underground control center. Although I fully realize the advisability of such an installation for use by key civil defense personnel and public officials, Omaha, due to financial difficulties in all areas relative to public services, has been unable as yet to afford such an installation.

4. No underground structures having a dual civil defense purpose such as parking garages have, to date, been constructed in our city. State law prohibits the city of Omaha itself from engaging in the business of constructing parking lots or garages for revenue.

5. Fallout protection in the form of structural modifications has not been incorporated in any of our public schools. Our local director of civil defense, Wm. Dean Noyes, has been critical of the failure of school officials to construct dual-purpose underground rooms to be used for shelters as well as perhaps libraries, cafeterias, study halls, etc., particularly since a great public school building program has been going on in Omaha for several years and is continuing, and also since the buildings are primarily glass and brick, neither of which are desirable for any sort of protection.

6. Evacuation-reception centers have been to some degree prepared by a few of the communities to the north and northwest of the city of Omaha, such centers being primarily churches, schools, public buildings, etc. It is expected that the radioactive fallout in these particular areas would be relatively light because of their location and no additional protective measures have been taken against this hazard.

Emergency supplies, except for medical needs, have not been stockpiled, it being felt that stocks from the communities themselves would be adequate for a period of time which would allow the shipping in of other required necessities to the support area.

Utilizing all buildings and private dwellings which we might expect to be in a very light fallout area, it is presumed that protection for perhaps 200,000 (estimated) people could be provided.

7. The changes in Federal policy which might achieve greater fallout protection for the people of Omaha or other cities might be:

(*a*) Emphasis upon the need for the incorporation of fallout shelter rooms in schools emanating from the Department of Health, Education, and Welfare and directed to the superintendent of schools and the boards of education.

(*b*) A thorough education of the Congress of the United States by men such as yourself as to the moral responsibility which each bears in keeping their constituents fully informed as to the danger which each citizen faces in the event of a natural or national disaster, emphasizing the fact that protection and survival are individual responsibilities.

Great emphasis by Congress and the military is being placed upon the capabilities of Russia and the United States in relation to wartime activities but it is a rare thing to hear of any emphasis being placed upon the ability of the American populace to survive an attack. Our retaliatory potential and successes will certainly be of little interest to a decimated U.S. population.

I think it behooves men in all key positions to lend a vocal support to worthwhile civil defense programs since the people of this country look to their leaders in Washington for guidance. When no activity other than criticism which lacks alternate constructive suggestions is forthcoming from leadership, the people take a dim view of the value of civil defense and its worthwhileness.

If other Members of Congress could point out the need for individual shelters in old homes and the incorporation of such units in new homes, as well as the need for improvising or altering buildings already con-

structed to afford at least some shelter to the working personnel therein, surely more local action throughout the Nation along these lines would be realized.

The passage of Public Law 85–606 by Congress would certainly do much to enable Omaha and other cities to expand their civil defense programs to a degree that would make them far more effective than they are at this time due to a lack of local financial abilities.

I appreciate the interest that you have shown in this program which is so vital to the survival of our Nation as a democracy and hope that you and other leaders will continue to aid in its development.

Sincerely yours,

JOHN ROSENBLATT,
Mayor, City of Omaha.

STATE OF NEVADA CIVIL DEFENSE AGENCY,
Carson City, Nev., March 10, 1960.

Mr. CHET HOLIFIELD,
Chairman, Military Operations Subcommittee,
House Office Building, Washington, D.C.

DEAR MR. HOLIFIELD: Your letter of February 10, addressed to Gov. Grant Sawyer, of the State of Nevada, has been referred to this office for reply.

Following are our answers to the questions [questions deleted]:

1. Two that we know of.
2. None.
3. No.
4. None.
5. None.
6. None.
7. In new buildings or remodeling old Federal buildings, put in fallout shelters.

It is hoped that, in some way, they can utilize the mines which are scattered throughout the State of Nevada, which would be very good protection from fallout, that are nice and dry, and in many instances they have caretakers. Why couldn't these be used by the Federal Government to stockpile food and supplies at a very nominal cost compared to what it is costing the Federal Government at the present time for storing or surplus foods in the Middle West?

Sincerely yours,

CLAUDE U. SHIPLEY, *Director.*

STATE OF NEW HAMPSHIRE CIVIL DEFENSE AGENCY,
Concord, February 17, 1960.

Congressman CHET HOLIFIELD,
Chairman, Military Operations Subcommittee,
Washington, D.C.

DEAR CONGRESSMAN HOLIFIELD: Gov. Wesley Powell has referred your letter of February 10, 1960, to me for reply. Answers to the questions asked are submitted below. [Questions deleted.]

1. None.
2. None.
3. No.
4. None.
5. None.
6. All public buildings in the State including schools have been designated as reception centers or for other civil defense uses. However, these provide only minimum fallout protection. None have been specifically stocked with emergency supplies.
7. This cannot be answered categorically. Making Federal funds available on a 50-50 basis for both public and privately owned buildings, including residences, would encourage the construction of fallout shelter in existing buildings, though I doubt if the result would be significant except over the long term. In new Federal construction it should be mandatory to include provision for congregate public shelter. This should be done in new State construction as well, on a Federal-aid basis.

Sincerely,

C. A. BRINKMANN,
State Director of Civil Defense.

CITY OF CONCORD, N.H.,
February 29, 1960.

Mr. CHET HOLIFIELD,
Chairman, Military Operations Subcommittee,
House Office Building, Washington, D.C.

DEAR MR. HOLIFIELD: In regard to the questions in your letter of February 10 relative to study of civil defense in the United States, with special reference to the construction of shelters in the city of Concord, the answers are as follows:

Question 1. None.
Question 2. None.
Question 3. No.
Question 4. No.
Question 5. No.
Question 6. No.
Question 7. Public education relative to the matter of protection in cases of disaster.

Very truly yours,

CHARLES P. JOHNSON, *Mayor.*

STATE OF NEW JERSEY,
DEPARTMENT OF DEFENSE,
Trenton, February 26, 1960.

Hon. CHET HOLIFIELD,
House Office Building, Washington, D.C.

DEAR CONGRESSMAN HOLIFIELD: Your letter of February 10 to Gov. Robert B. Meyner has been referred to this department for reply. Answers to your questions are as follows [questions deleted]:

1. To determine a specific answer to this question, a survey of the State would have to be undertaken, which has not been done nor is it contemplated. At least 50 prototype shelters have been built in various locations in New Jersey to demonstrate and encourage the public to put them in their homes. These shelters were built at little cost because of the assistance of the Portland Cement Association, New Jersey Homebuilders, labor unions and suppliers. The results of this campaign are unknown, as the shelters have been in existence for less than 2 months.

2. The State is personally undertaking an engineering survey of State-owned buildings to find out what shielding is necessary for fallout, and the cost.

3. The State control center is partially underground; it needs modification to provide the proper shielding.

4. To our knowledge, there are none presently constructed, although the city of Newark has plans for a public shelter to be used as a parking garage under one of its city parks.

5. Fallout protection in the form of structural modifications has not been incorporated in any of our public schools.

6. Our New Jersey State civil defense plan has designated evacuation-reception centers in schools, public buildings, and State institutions for the use of evacuees. They are earmarked for this specific purpose but they have not been stocked with emergency supplies nor have any modifications been made for shielding from radioactive fallout. Our strategic evacuation plan does not contemplate keeping people in these evacuation-reception centers for any length of time. People will be dispersed from them to private homes and/or buildings in the area.

7. Federal policy is good as far as it goes, but we do not believe that homeowners on a large scale will undertake to build fallout shelters unless they receive some financial assistance. This can take various forms but it must be initiated by the Federal Government. A direct grant shared by the State and local governments along with the building owner is one method. Another is income tax deduction, and certainly a homeowner should not be penalized by an increase in his real estate tax for building a shelter. Our State legislature is considering a bill presented by a member of the assembly prohibiting an increase in the homeowner's real estate tax if he builds a fallout shelter.

Sincerely,

JAMES F. CANTWELL,
Major General, NJARNG, The Chief of Staff.

CAMDEN CITY CIVIL DEFENSE COUNCIL,
Camden, N.J., March 8, 1960.

Mr. CHET HOLIFIELD,
Chairman, Military Operations Subcommittee, of the Committee on Government, Operations, House Office Building, Washington, D.C.

DEAR MR. HOLIFIELD: Referring to your letter of February 10, forwarded to Hon. Alfred R. Pierce, mayor of the city of Camden, we are furnishing here below information as requested in your letter. [Questions deleted.]

1. One basement shelter has been constructed in a city-owned property which will be used as a model shelter for display to the public.

No other home shelteds have been constructed in our city and this information would be reflected in any building permits which would have been issued during the past 2 years.

2. None.
3. No.
4. No.
5. No.
6. Our evacuation-reception center can be prepared in a matter of minutes to handle evacuees from our city in the event of an emergency. This center is stocked with emergency supplies; i.e., cots, medical supplies, and also equipment for feeding and preparation of foods. This center will accommodate approximately 1,000 to 1,500 people, but this center does not provide adequate protection against radioactive fallout.
7. Recommended suggestions:
   1. Standardization of procedures nationwide.
   2. Popularizing the shelter program by underwriting a program which would stimulate interest of individuals and families, clubs, organizations to undertake the project of building shelters in homes. This could be accomplished through working with the National Advertising Council—a program similar to "Smokey, the Bear" used for Fire Prevention Week.

Sincerely,

JOHN C. DANAHER, *Director.*

STATE OF NEW MEXICO,
OFFICE OF CIVIL AND DEFENSE MOBILIZATION,
Santa Fe, N. Mex., February 18, 1960.

Hon. CHET HOLIFIELD,
Chairman, Miltary Operations Subcommittee of the Committee on Government Operations, House Office Building, Washington, D.C.

DEAR CONGRESSMAN: Gov. John Burroughs of New Mexico has turned over to me your questionnaire dated February 10, 1960, for reply, which follows:

1. Two prototype home shelters have been constructed without expense to the Federal Government at the New Mexico State Fair Grounds for display and study purposes. The Federal OCDM now is completing negotiations to build another shelter at a home in Santa Fe. No other shelters, as such, are known to me to exist in New Mexico.
2. To my knowledge, no public building in New Mexico has been modified to provide fallout shielding.
3. We have a State government relocation site 20 miles from the capitol, but we do not have an underground control center.
4. All structures of substantial size in New Mexico are, of course, constructed with basements. However, I do not know of any underground facility that has been built to serve a dual civil defense purpose.
5. No structural modification to provide fallout protection has been incorporated in a New Mexico public school.
6. We have reception and care areas provided for in the New Mexico operational survival plan, but we have no special centers other than existing structures such as armories, school buildings, etc. The survival plan provides for the relocation of some 450,000 persons who reside in target areas. New Mexico's current estimated population is 900,000; reception and care has been based on a 1-for-1 ratio—that is, 1 person dwelling in a nontarget area to accommodate 1 person displaced from a target area.
7. I think Congress and OCDM should do everything possible to implement an all-out shelter program designed to provide individuals with both an awareness of the need for family fallout shelter protection and every encouragement and aid short of an actual subsidy to construct a shelter.

Very truly yours,

WM. ADAIR GOSSETT, *Director.*

STATE OF NEW YORK,
EXECUTIVE CHAMBER,
Albany, March 15, 1960.

HON. CHET HOLIFIELD,
Chairman, Military Operations Subcommittee of the Committee on Government Operations, House Office Building, Washington, D.C.

DEAR MR. HOLIFIELD: Governor Rockefeller has asked me to reply to your letter of February 10 requesting information with respect to fallout shelter construction in New York State.

Before proceeding to answer the specific questions you ask in your letter, I believe it would be helpful to a better understanding of the shelter program in New York State and the progress being made in this connection to review the development of this program.

The Governor appointed, early last year, a special task force on protection from radioactive fallout. The task force was established to study the problem of radioactive fallout in New York State in the event the United States is attacked with nuclear weapons and to recommend protective steps which the State should take to assist its people to meet the responsibility that has been placed upon them under the national plan for civil defense; namely, the responsibility to survive, without any outside help, for a minimum of 2 weeks after a nuclear attack.

The task force reported on July 6, 1959, recommending a program directed toward providing the essentials of knowledge, shielding, and survival supplies. A copy of the task force report is attached.

Upon the recommendation of the State defense council, which adopted the task force report, the Governor then appointed a 10-member interdepartmental committee on fallout protection problems, later designated the State committee on fallout protection, to initiate promptly studies of costs and methods of carrying out the proposals for fallout shelters and survival kits. The Governor also appointed a special assistant to work with the interdepartmental committee in implementing the defense council's recommendation that the State communicate awareness and knowledge about the danger of fallout and the defense against it.

The State committee on fallout protection submitted its report on February 15, 1960, a copy of which is attached. Finding that civilian unpreparedness against radioactive fallout from nuclear attack was "unthinkable," the committee recommended that legislation be initiated requiring fallout shelters in New York State. The committee's report was adopted by the State defense council on February 23, 1960.

One of the acknowledged problems facing the State of New York is the inadequacy of data. For this reason, the recent report envisages a substantial number of local surveys in the year ahead as a necessary first step in the fallout shelter program.

For example, the number of civil defense home shelters constructed in the State is unknown since no special record is maintained. We do know that because of the impetus of the findings of the special task force report, of which over 1½ million copies have been distributed throughout the State, home fallout shelters are now being constructed, and interest in exploring shelter construction possibilities is increasing. Several local civil defense organizations have constructed full-scale model home fallout shelters which are on exhibition. Others have been exhibited at State and local fairs, in bank lobbies, and in other public places.

The number of public buildings that have been modified to provide shielding from fallout is also unknown. The Governor has already ordered the construction of shelters in all new State buildings. This should serve to encourage similar action by the political subdivisions of the State.

Plans are now being drawn to construct an emergency operating center (alternate seat of State government) with living facilities which will accommodate the executive staff and key officials of the State departments and agencies, the State legislative leaders, and the State civil defense operating staff. This center will be used by the State civil defense commission as an administrative headquarters during peacetime. The center will be a blastproof structure designed to accommodate 640 persons. Along the same lines, plans are in the design stage for modifying the basement of the State capitol to provide for fallout protection for a large number of persons.

Information on the number of dual-purpose underground structures and on structural modifications in public schools also is lacking. In connection with

the latter, provisions will be made for fallout protection shelters in public schools as soon as the State shelter program crystallizes. Representatives of the Catholic parochial schools have already contacted the commission for information on fallout protection measures.

The New York State civil defense plan calls for the use of private homes and, where necessary, selected buildings suitable for congregate lodging for the shelter and care of evacuees. Primarily, homes and buildings with basements and other protective facilities located outside the aiming areas will be utilized for this purpose. Assignments of billets will be made according to designated welfare areas generally comprising a town or a portion of a town. We will have more than 1,000 such welfare center areas. A few are well organized, and many have personnel appointed and trained. Aside from medical supplies and equipment, there has been no stockpiling of emergency supplies.

The number of people who can be received and protected can only be estimated, since only a few surveys of basement accommodations have been made. A rough estimate is 5 million persons.

Up to the present time, we have endeavored to cope with the evacuation-reception problem utilizing existing resources. As the State fallout shelter program gets underway, our resources will be enhanced; and those whom it will be necessary to evacuate will be increasingly better protected. In view of its vital importance, this problem will be continually studied to achieve the most workable solution.

To encourage early compliance with its proposals and to help relieve the financial burden of the fallout protection program on all citizens, the State committee on fallout protection recommended that the cost of shelter construction be excluded from local assessment for tax purposes and that the cost of shelter construction be excluded from any applicable State tax based on the cost of real property. The maximum exclusion for either local or State tax computation is set at $100 per planned shelter occupant.

The committee also recommended that deduction be permitted of shelter construction costs, both residential and nonresidential, from taxable income, for New York State income tax purposes, up to a maximum of $100 per planned occupant. These deductions would be taken over a period of 5 years. The committee then urged that the Congress be memorialized to enact similar provisions in the Internal Revenue Code.

Should you require further information about the fallout shelter program in New York, please feel perfectly free to call upon us.

Sincerely,

C. V. R. SCHUYLER,
Executive Assistant to the Governor.

CITY OF BINGHAMTON, N.Y.
February 18, 1960.

Hon. CHET HOLIFIELD,
Chairman, Military Operations Subcommittee,
House Office Building, Washington, D.C.

DEAR CONGRESSMAN HOLIFIELD: In answer to your recent letter:

1. None.
2. None.
3. No. (We do have the control center in the basement of a public building. If that is considered underground, the answer is "Yes.")
4. No.
5. No.
6. No.
7. I think that the Federal Government should find ways and means of overcoming the public apathy in regard to civil defense. I further think there should be some public financing of fallout shelters. City governments are not in a financial position to build them to the extent that they are needed.

Very truly yours,

JOHN J. BURNS, *Mayor.*

CONSOLIDATED ERIE COUNTY OFFICE OF CIVIL DEFENSE,
Buffalo, N.Y., February 24, 1960.

Congressman CHET HOLIFIELD,
Chairman, Military Operations Subcommittee,
House of Representatives, Washington, D.C.

DEAR CONGRESSMAN: In reply to your letter of February 10, 1960, directed to Mayor Frank A. Sedita, I have been requested by the mayor to formulate a reply.

The following answers are submitted in reply to the questions in the order in which these questions were submitted:

1. To the best of our knowledge, there have been three home fallout shelters constructed.

Building permits would not reflect such information unless construction was mandatory.

2. None at present.

New post office plans now being made should be checked for shelter provisions.

3. Not at present.

Plans and details for a modern control center are now under consideration by the board of supervisors. These plans will include provisions for space for continuity of county government.

4. None at present.

5. None at present.

6. Evacuation-reception centers have been prepared. It is not contemplated to hold people at reception centers.

7. Some form of financial assistance or tax allowance on the cost of the shelter.

In view of the present preattack alerting information which indicates that we cannot expect any more than 30 minutes preattack warning, it seems obvious that cities as large as Buffalo will be unable to carry out an evacuation plan. Therefore, it is obvious if we are unable to evacuate our people we must of necessity have fallout shelters to properly protect the residents of our community from the effects of a nuclear attack. I, therefore, highly recommend that the Federal Government take necessary steps to encourage the people to erect such fallout shelters by offering them some form of tax relief for such projects.

Sincerely,

WILLIAM J. FLYNN,
County Director and Deputy State Director.

THE CITY OF NEW YORK,
OFFICE OF CIVIL DEFENSE,
New York, N.Y., March 21, 1960.

Hon. CHET HOLIFIELD,
Chairman, Military Operations Subcommittee,
House of Representatives,
Washington, D.C.

DEAR CHAIRMAN HOLIFIELD: Your letter to Mayor Robert F. Wagner of February 10, 1960 has been forwarded to me for reply.

Please find attached the information sought by the Military Operations Subcommittee to complete its study.

With my sentiments of high regard I am,

Sincerely yours,

ROBERT E. CONDON, *Director.*

ANSWERS TO QUESTIONS BY MILITARY OPERATIONS SUBCOMMITTEE

[Questions deleted]

1. Scattered instances where shelters have been constructed.

Only if outside shelters or shelters requiring substantial changes within the home are contemplated, are building department permits necessary.

2. None.

3. Five civil defense control centers. One in each borough of New York City.

4. Several large commercial buildings have included underground space which would provide desirable dual purpose areas but which has not been stockpiled and otherwise provided with survival equipment in accordance with civil defense emergency requirements.

5. No. Survey made by deputy superintendent of plant operations and maintenance, board of education. Result: Cost prohibitive—in some instances the price of alteration would exceed the original cost of the school.
6. First sentence: Yes. Answer to sentences 2 and 3 cannot be made unless a survey of the entire area is made.
7. A change granting adequate financial assistance.

ROME CIVIL DEFENSE COUNCIL,
Rome, N.Y., February 18, 1960.

Hon. CHET HOLIFIELD,
Chairman, Military Operation Subcommittee,
House Office Building, Washington, D.C.

DEAR CONGRESSMAN: Mr. Charles Lanigan, mayor of the city of Rome, has referred to me for reply, your letter of February 10, 1960, which requests information concerning the city's "shelters." The following will answer your questions in the order asked and will reflect the current state of shelters in the city of Rome.

There have been no home shelters constructed in Rome that are known to the undersigned. This information would not be reflected in building permits, unless connected with new home constructions. The building permits reflect none.

No public buildings in the city of Rome have been modified to provide shielding from fallout.

The Rome Civil Defense Control Center is located in a basement room of Gansevoort School, West Liberty Street, Rome, N.Y. This room is approximately three-quarters below the surface of the ground. However, there are windows at ground level.

There have been no underground structures having a dual purpose with civil defense, such as parking garages, constructed in the city.

There have been no structural modifications in any of Rome's schools to provide fallout protection. I might advise that this office has made special mention to the Rome Board of Education of the necessity for providing fallout protection, and that such should be planned, particularly in new construction. This office has also made recommendations to all local builders and has provided them with brochure material relating to shelter construction, urging that any new construction incorporate shelter provisions. I cannot report that this advice has been heeded in any respect.

The schools constructed in recent years in Rome, are identified by vast expanses of window walls, and with a minimum of shelter potential. Some months ago, I wrote to the Rome Board of Education, expressing my concern over the lack of shelter potential in the latest addition to the Rome school system, the George R. Staley Junior High School, and expressed the view that the building was, in terms of protection potential, a glassy horror. I am not aware that this condition differs to any material degree in other cities and the new schools being built. It is one, however, which must be viewed with alarm.

Evacuation plans for the Utica-Rome target support area, have been prepared and approved by both New York State and Federal civil defense officials. The reception areas for the city of Rome are in Otsego, Lewis, Madison, and Chenango Counties. Reception centers there do not provide for better protection against fallout than existed prior to this planning, neither are such centers stocked with emergency supplies. The evacuation plans envisioned such centers as points for reception and immediate dispersal thereafter to provide homes. Such emergency supplies as exist would be those provided in private homes. These plans were completed after population and home surveys of the four county Utica-Rome area, and provide for reception of specified numbers of persons in specified areas. As the situation now stands, the State's announced policy is, that we do not "run from fallout." Any evacuation undertaken would occur following orders from the New York State director.

The Federal Government might, by setting a better example in the matter of providing fallout protection, impress the people of Rome with the necessity for making such provisions in their homes. The present Federal policy is, as I see it, not to spend great sums of Federal money to provide the necessary protection, but rather by use of its information program, research facilities, and practical example, assist the various States and localities in helping themselves. The Federal installations in the Utica-Rome areas, and particularly in the city of Rome, do not, to my knowledge, contain what may be termed, suitable shelter

areas. If they do, there has been no public announcement of this fact. Neither am I aware that they are stocked with emergency provisions and supplies, such as are urged upon all householders. Griffiss Air Force Base lies within the limits of the city of Rome, and on a normal workday houses about 8,000 civilian employees and 2,000 military personnel. It is quite conceivable that an alert situation might prevent the civilian work force from returning to their homes, and thus require them to seek shelter on the base. I am not aware that existing shelter potential would accommodate 8,000 civilians who are employed on the airbase. I am certain that it does not exist in local industry or schools.

I believe the shelter program is one that requires continuing effort to educate the public in order, that sometime in the future, a reasonable shelter potential be attained.

Very truly yours,

Capt. L. J. SCHELTER, *Director.*

CITY OF SCHENECTADY, N.Y.,
February 24, 1960.

Hon. CHET HOLIFIELD,
Chairman, Military Operations Subcommittee,
House Office Building, Washington, D.C.

DEAR MR. HOLIFIELD: In response to your letter of February 10, 1960, I respectfully submit the following information, as it applies to your questions, in reference to our civil defense program. [Questions deleted.]

1. The civil defense director has on record only a few cases where individuals have modified their buildings to provide shielding areas against fallout. Our records indicate that this has been accomplished on a "do it yourself" and is not reflected in our building permits on any new construction.

2. To date there are no public buildings in our area that have been modified to provide shielding against fallout, however, the civil defense office is making a study of same and will report and make recommendations.

3. No, however, the control center and alternate control center are in subbasement areas which will be modified to provide adequate shielding for operating staff for a 14-day period.

4. None.

5. Public, parochial, and private school authorities have been advised as to shelter needs but to date no structural modifications have been made.

6. The Schenectady Target support area has developed plans for the reception of evacuees and trained key personnel are available to put plans into effect if sufficient warning time permits, but once again the only degree of shelter or stockpiling of foods and other emergency supplies would be that which is now available. To the best of my knowledge, no buildings have been modified or special stockpiling been accomplished. Plans include inventories of resources and facilities.

7. (1) The adoption of a "go home" survival plan by every community.

(2) A stepped-up public information program by the Federal and State governments emphasizing the effects of fallout and the protection which home shelters will provide.

(3) A Federal and State financial assistance plan to individual homeowners, industries, etc. to cover building cost.

(4) The Federal Government should provide more adequate support in the form of administrative matching funds to cover costs of the civil defense program, similar to those proposed in Public Law 85–606 which was presented to the 86th Congress and denied.

(5) Last, but of prime importance, every public building, on all government levels which is being planned, should include a dual-purpose area in said plans. This should be immediately put into effect in such instances as public housing, schools, etc., in which financial assistance is being provided by the Government.

Very truly yours,

MALCOLM E. ELLIS, *Mayor.*

STATE OF NORTH CAROLINA,
CIVIL DEFENSE AGENCY,
Raleigh, March 7, 1960.

Hon. CHET HOLIFIELD,
Chairman, Military Operations Subcommittee of the House Committee on Government Operations, Washington, D.C.

DEAR MR. HOLIFIELD: In accordance with a request from the Governor's office and your letter dated February 10, 1960, the following is submitted, your questions and the answers:

1. How many civil defense home shelters have been constructed in your State?

Answer. Twenty-five.

2. How many public buildings in your State have been modified to provide shielding from fallout?

Answer. Two.

3. Does your State civil defense agency have an underground control center?

Answer. No.

4. How many underground structures having a dual civil defense purpose, such as parking garages, have been constructed in your State?

Answer. None.

5. Have fallout protection, in the form of structural modifications, been incorporated in any of your public schools?

Answer. No.

6. How many evacuation-reception centers have been prepared either within your State or in other States for use by evacuees from your State?

Answer. Thirty-six.

Are such reception centers stocked with emergency supplies and do they provide adequate protection against fallout?

Answer. These are prestocked with medical supplies. Only fallout protection would be that of the ordinary existing buildings which would give some protection.

How many people will they protect?

Answer. This would be problematical as there have been no special shelters for evacuees, only existing buildings.

7. What changes in Federal policy do you think are necessary to achieve greater fallout protection for the people of your State?

Answer. It is believed that before we are able to achieve any notable success in the area of fallout protection for the individual citizen there must be some measure of financial relief. Not in grants of actual cash but in the form of tax relief—say, an exemption of a certain amount of dollars for the construction of a family shelter when preparing an individual yearly income tax statement.

With kindest personal regards and best wishes, I am

Sincerely,

EDWARD F. GRIFFIN, *Director.*

ORGANIZATIONS FOR CIVIL DEFENSE,
Raleigh, N.C., February 24, 1960.

Hon. CHET HOLIFIELD,
Chairman, Military Operations Subcommittee,
House Office Building, Washington, D.C.

DEAR SIR: I have been asked by the mayor of Raleigh to reply to the enclosed letter from you dated February 10, 1960, in regard to fallout shelters and Federal policy changes which I think may be necessary to achieve greater fallout protection for the people of this city and county. Our reply is attached to the letter.

I am deeply appreciative of the interest you have shown in our civil defense program and to all of us who are working on same.

With best personal wishes, I am,

Sincerely yours,

DAVID L. HARDEE, *Director.*

1. This civil defense office has for several years insisted that houses and apartments have a basement with an inside and an outside entrance in which fallout shelters can be hastily constructed. Some work has been done on this with the architects and contractors, but with little success. Apartment houses as a rule in this section of the country have little or no basement, and the ranch-

type of residence which is very popular has little or no basement provision. We feel that our work in this respect has accomplished something prior to the time the fallout shelter campaign was launched, but the results are intangible and difficult to catalog. A good deal of fallout shelter literature has been distributed as well as plans for building the shelters, and we feel that this has created some interest. One or two people who are building plan to put fallout shelters in their basements, and two are being constructed in the city—an inside one and an outside one—for demonstration purposes. These are being built under the OCDM shelter program with the supervision of the State civil defense agency. Some of the local contractors have also demonstrated an interest in providing shelters in their new homes.

2. As far as this office knows, there have been no public buildings modified to provide shielding from fallout. However, a number of public buildings have been built with basements which could be adapted to this purpose.

3. This agency does not have an underground control center. At some time in future it may be practical to put one under one of the proposed new fire stations, provided funds are made available by the Federal Government for such projects.

4. No underground structures having a dual civil defense purpose have been constructed in Raleigh. It is customary to build parking garages here with the first floor either on ground level or just a little below. One parking garage was recently constructed in Raleigh with a partial basement, but not with a view to fallout shelter.

5. This office has worked for a long time on the proposition of conducting air raid drills in the public schools, and they have been well organized for same. In the plan, the children in school are marched to, and take position in the safest place in the building. This is usually the basement, if one exists, and on ground floors as far away from windows as possible. Many old type school buildings have sufficient masonry in the walls to be of some protection to the pupils. Where adequate basements exist to take care of all of the children, it is usually the result of designing the building to fit the terrain, etc., rather than planning for shelter in case of enemy attack or violent storms.

Most buildings have sufficient space to take care of the children in air raid positions without their being exposed too greatly to flying glass which would result from explosions. We have worked with school superintendents, architects, and the State offices concerned with designs for public schools to stop the popular tendency of building glass showcase school buildings which afford minimum protection for the lives and safety of the pupils on account of the hazard of flying glass. Some results from this work have been noticeable, but no particular fallout protection has yet been accomplished as a result of this current campaign.

6. Evacuation-reception centers have been designated for the Raleigh target area, only one or two of which are in the county, the remainder being in adjacent counties which largely make up our reception areas. These centers have been designated in our target area survival plan, and two emergency hospitals have been provided—each with 200 beds. The plan includes the use of school and college buildings, tobacco warehouses and storage buildings, as well as residences in the reception areas. These centers have not been provided with protection against fallout, and are not stocked with emergency supplies, other than some medical supplies which were procured by the State civil defense agency for this target city area. It is estimated that with crowding the above named facilities the 220,000 people in the Raleigh target area may be taken care of with some type of shelter including living in their cars and trailers.

7. Changes in Federal policy that could achieve greater fallout protection for the people of this city and help the civil defense program generally are:

(*a*) The implementation of Public Law 85–606 with sufficient funds to double the personnel in each civil defense office in the country. This office is considerably understrength in personnel and we do not have sufficient forces to follow through on our civil defense programs.

(*b*) To have the Federal Government match funds for the construction of fallout shelters and air raid shelters in public buildings at all levels; in commercial buildings, and in homes.

(*c*) It would help the local director at grassroots level very greatly if the policy of OCDM could be settled to a point where equal emphasis would be continually placed on the importance of education for evacuation; on the preparation of air raid shelters and fallout shelters; on chemical warfare without losing sight of the importance of any of these four vital phases of civil defense preparation. It has been my observation from 5 years

experience as a local civil defense director that we cannot get the public acquainted with one phase of civil defense before we are plunged into another, to the neglect of the former. It is realized that it requires a great deal of time and emphasis on any one civil defense measure to bring it before the public with sufficient publicity to impress lethargic people. It would help to overcome a great deal of difficulty in the country if we could keep a well balanced program before the public.

DAVID L. HARDEE, *Director.*

STATE OF NORTH DAKOTA,
OFFICE OF THE GOVERNOR,
Bismarck, February 23, 1960.

Hon. CHET HOLIFIELD,
Chairman, Military Operations Subcommittee, House Office Building, Washington, D.C.

DEAR CONGRESSMAN HOLIFIELD: In response to your letter dated February 10, 1960, I wish to advise that in the past year, OCDM has distributed to our State civil defense office and to the county and city defense directors a great deal of material covering shelters, i.e., plans, specifications for all different types of shelters, booklets, pamphlets, inserts, and enclosures in all kits such as rural civil defense kit, home preparedness kit and others.

In this State, OCDM has offered to subsidize the erection of two prototype home shelters to serve as patterns for the general population; however, I have rejected such offers as, in my opinion, offering Federal subsidy to two private individuals would cause confusion and lead to hard feelings by those people required to build their shelters from personal funds.

I believe that guidance and direction for the shelter program should originate with Federal agencies for shelters in Federal buildings, post offices, armories, schools, hospitals and any new buildings erected that receive Federal grants to aid in their construction.

Answers to your questionnaire are as follows: (1) Scattered shelters constructed by individuals with personal funds. (2) None known. (3) No. (4) None. (5) None known. (6) Construction of evacuation-reception centers as such are not contemplated at this time. The State survival plan covers evacuees from stricken areas to be housed on a family-to-home basis in support areas. Our State has no metropolitan areas and support areas will be our major mission. We would have approximately 160,000 evacuees. (7) Refer to paragraph 3 above. That plan would develop shelter consciousness and homeowners would follow the pattern by erecting home shelters at personal expense.

The national civil defense program has assisted materially in this State by the matching funds program for necessary hardware, i.e., mobile and fixed communications, hospital and other standby generators, rescue trucks, sirens, emergency hospitals, radiological equipment and many other items eligible under the contributions manual.

With 3 exceptions, our 53 county civil defense directors are volunteers.

Sincerely yours,

JOHN E. DAVIS, *Governor.*

CITY OF BISMARCK, N. DAK.,
February 16, 1960.

Hon. CHET HOLIFIELD,
Chairman, Military Operations Subcommittee,
House of Representatives, Washington, D.C.

DEAR SIR: Following are the answers to the questions contained in your letter of February 10 relative to civil defense in our city:

1. No shelters have been constructed.
2. None.
3. No.
4. No.
5. No.
6. No.
7. We have gone into the aspects of civil defense and do have a local chairman who is directly responsible to the board of city commissioners. His main duties have been the organization of auxiliary fire and police forces together with organization of the city for evacuation to certain areas. Needless to say,

we all realize that in the event of an attack, most any city in the United States would be virtually unprepared. I am sure you are familiar with financies of a municipality which does not permit us to have any extra money on hand other than the ordinary budget. With the Federal Government taking such a large portion of the individual's income, it is quite difficult to see any way in which to increase the income of our local government.

Yours very truly,

EVAN E. LIPS, *Mayor.*

STATE OF OHIO, ADJUTANT GENERAL'S DEPARTMENT,
Columbus, Ohio, March 3, 1960.

HON. CHET HOLIFIELD,
Chairman, Military Operations Subcommittee,
House Office Building, Washington, D.C.

DEAR CONGRESSMAN HOLIFIELD: This will acknowledge your letter of February 10, 1960, addressed to Governor DiSalle requesting data on the fallout shelter program in Ohio. The Governor has asked that I reply to your letter.

While the announcement of the national shelter policy was made during Operation Alert, 1958, a considerable period of time elapsed in the development of standards and in the production of promotional material based on engineering data and criteria. It was not until after June 1959 that such data, criteria, and plans were made available for national distribution. The implementation of the shelter program was keyed, of course, to the availability of this basic information and appropriate plans.

In Ohio, we believe that appropriate plans should involve absolutely minimal requirements, on a do-it-yourself basis, coupled with the definite intention to increase the scope, capability, and appointments of the shelter area, its facilities, food, and equipment stocks on a progressive basis as funds and/or time permit. This concept was presented in written form to the Office of Civil and Defense Mobilization for its consideration with a recommendation for adoption. It was believed that this concept would make shelters not only more acceptable to the mass of our population, but more feasible from the standpoint of cost, and thus for more immediate implementation by the largest possible number of our people. The standards and criteria published in June 1959 set up financial and structural requirements which actually deter, if they do not completely prevent, large numbers of our people from constructing fallout shelters.

We still believe that, to meet the worst possible attack situation, fallout shelter, on a minimal basis, is necessary if our people are to meet and survive the aftermath of a determined nuclear attack on our country.

While the public is evidencing an increasing awareness of the need for shelter under such conditions, the Federal policy has not had the influence or impact on civil defense that it could have had with a simpler initial approach to the problem.

To specifically answer your questions, I submit the following, in the order in which the questions were posed:

1. Based on OCDM standards, the total civil defense home shelters constructed in Ohio up to this time probably do not exceed 100. Based on our Ohio concept, we believe there are already thousands of shelters, needing limited food and equipment facilities to be operationally effective.

2. No information is available indicating that any public buildings in Ohio have been modified to provide shielding from fallout.

3. Ohio does not have an underground control center.

4. No underground, dual civil defense purpose shelters have been constructed in Ohio. However, two industrial shelters have been constructed—one by the Cincinnati Milling Machine Co. in Cincinnati and one by the Cleveland Twist Drill Co. in Cleveland. This latter is now being used as a cafeteria and thus should probably be considered in the dual-purpose category.

Ohio has pioneered in the passage of legislation to exempt property owner from the real estate and improvements tax on shelter facilities and equipment, constructed and used exclusively for shelter purposes (see copy of the act attached).

5. We know of no schools in Ohio with structural modifications specifically incorporated for fallout protection.

6. Our survival plans for Ohio and its critical target cities have established locations, facility, and personnel requirements for the care and reception of 6 million evacuees, of which the vast majority would be housed in private dwel-

lings, not to exceed 2 persons, on the average for every 1 now residing in the reception centers or in the smaller centers of population and the suburban and rural communities of our "support counties." These plans include such facilities, in the States of Pennsylvania, West Virginia, Kentucky, and Indiana, to supplement Ohio's capabilities in this category. None of these is stocked with emergency supplies except as suburban and rural homes have, usually, larger quantities of food and supplies than are normally available in city homes and apartments. For the most part, these plans, and the private-home and facility units involved, provide from minimal to quite adequate fallout shelter structures, for upward of 5 to 6 million persons.

7. The changes in Federal policy necessary to achieve greater fallout protection include:

(*a*) A more positive declaration of the need by the President of the United States, through one or more half-hour radio and TV programs to the Nation.

(*b*) More positive leadership on the part of the Congress in:

(1) stating the need and creating a more healthy climate and a more united approach to the problem, which should not be partisan in any of its aspects;

(2) providing financial assistance by appropriations adequate to implement Public Law 85-606;

(3) recognizing that if the need is as great as it appears to be, delays, current unwarranted attacks, and indifference at the congressional level should be eliminated, as far as possible, if we are to expect positive response on the part of the public;

(4) seeing to it more information is released from classified status, giving a more complete basis for understanding on the part of the public and for more realistic planning on the part of civil defense.

Ohio, at this time, is making shelter a basic program for meeting the worst that can happen to us as individuals and communities. We are planning to inaugurate a simple but effective program for getting to the parents through their children in the schools. Finally, we also are giving priority to developing an awareness on the part of local and county government officials that those now responsible for operation of governments at their respective levels will be responsible for the welfare and safety of their people in major emergencies and, therefore, must establish an operational capability to meet such emergencies.

This information is forwarded in the hope that it will be helpful and that perhaps it may contribute to a better understanding of the current situation in Ohio. I hope also that it may result in a more positive and adequate approach to civil defense problems faced by all our States on the part of the Federal Government generally.

I extend all good wishes and kindest personal regards.

Sincerely,

LOREN G. WINDOM,
Major General, The Adjutant General.

[Amended House Bill No. 648]

AN ACT To encourage and stimulate the installation and dedication of civil defense facilities by private initiative, through insuring that no burden of state or local taxes shall be incurred as a consequence of measures taken for the better protection of persons and property against enemy action and the alleviation of the physical effects thereof

Be it enacted by the General Assembly of the State of Ohio:

SEC. 5915.21. As used in this act "civil defense facility" includes "structures" and "equipment" herein with respect to which a certificate under section 2 of this act is in force.

"Structure" includes air-raid shelters, additions to or alterations of existing buildings and portions of existing buildings dedicated to public use, made and designed exclusively for protection against the shock or other effects of chemical biological, and radiological warfare, special housing for equipment as herein defined, and all other structural means of protection of persons and property against enemy action.

"Equipment" includes fire-fighting, first-aid, hospital, salvage, and rescue equipment and materials, equipment for the evacuation of personnel and portable effects, and all other means, in the nature of personal property, to be used exclusively in the protection of persons and property against enemy action and

of the prompt alleviation of the physical effects of enemy action upon persons and property.

"Enemy action" includes the intentional employment of every means of chemical, biological, and radiological warfare designed to injure the military or economic strength of the United States of America in the interest of an actual or potential enemy of the United States, whether or not committed during a state of war.

"Certifying authority" means the state director of civil defense provided for by section 5915.02 of the Revised Code.

"Civil defense certificate" means a civil defense certificate of necessity issued pursuant to section 2 of this act.

SEC. 5915.22. Application for a civil defense certificate of necessity shall be filed at such time, in such manner, and in such office as may be prescribed by regulation, issued pursuant to section 11 of this act, but no later than the expiration of six months after the beginning of construction, reconstruction, erection, or installation of the structure or the acquisition of the equipment, or six months after the effective date of this act, whichever is later. Such application shall be in such form as may be prescribed by such regulation and shall contain plans and specifications of the structure or structures, including all materials incorporated or to be incorporated therein, and a descriptive list of all equipment acquired or to be acquired. If the certifying authority finds that the facility or proposed facility is necessary in the interest of civil defense, is designed exclusively as a civil defense facility, and is suitable and reasonably adequate for the intended purpose, it shall issue a certificate to that effect. No structure or equipment shall be considered suitable and adequate unless it is constructed to provide reasonable protection against modern methods of warfare including chemical, biological, and radiological warfare in accordance with any standards of adequacy furnished by the federal civil defense administration.

SEC. 5915.23. Before issuing any civil defense certificate, the certifying authority shall give notice in writing by registered mail to the tax commissioner, and, in case the application relates to a structure, written notice to the county auditor of the county in which such structure is or is to be located, and shall afford to the applicant and the tax commissioner and the county auditor to whom such notice shall have been given an opportunity for a hearing. On like notice to the applicant and opportunity for hearing the certifying authority shall on its own initiative or on complaint by the tax commissioner or the county auditor of the county in which any property to which a civil defense certificate relates is located, revoke such civil defense certificate whenever any of the following shall be made to appear:

That the certificate was obtained by fraud or misrepresentation.

That the holder of the certificate has failed substantially to proceed with the construction, reconstruction, installation, or acquisition of the civil defense facility contemplated by the certificate.

That the structure, or the equipment, or both, to which the certificate relates is being used for the ordinary and usual purposes of the holder, and is or are no more than sufficient for such ordinary and usual purposes; provided, that where the circumstances so require, the certifying authority in lieu of revoking such certificate may modify the same by restricting its operation.

Upon the mailing of notice of the action of the certifying authority revoking or modifying a civil defense certificate, as provided in section 4 of this act, such certificate shall cease to be in force, or shall remain in force only as modified, as the case may require.

SEC. 5915.24. A civil defense certificate, when issued, shall be sent by registered mail to the applicant and notice of such issuance, in the form of certified copies thereof, shall be sent by registered mail by the certifying authority to the tax commissioner and to the county auditor of the county in which any property to which the same relates is located. Notice of the order of the certifying authority denying, revoking or modifying a civil defense certificate, in the form of certified copies thereof, shall be sent by registered mail to the applicant or the holder thereof and to the tax commissioner and such county auditor. The applicant or holder and the tax commissioner and such county auditor are deemed parties for the purpose of the review afforded by section 5 of this act.

SEC. 5915.25. Any party aggrieved by the issuance, the refusal to issue, the revocation or the modification of a civil defense certificate may appeal to the common pleas court of the county in which the property to which the same relates, or would relate. The party desiring to appeal shall file a notice of

appeal with the certifying authority setting forth the order appealed from and the grounds of his appeal. A copy of such notice of appeal shall also be filed by appellant with the court. Such notice of appeal shall be filed within fifteen days after mailing of notice as provided in section 4 of this act.

The filing of a notice of appeal shall not operate as a suspension of the order of the certifying authority. Within ten days after receipt of notice of appeal the certifying authority shall prepare and certify to the court a complete record of its proceedings in the matter. Upon demand by any party the certifying authority shall furnish at the cost of such party a copy of the stenographic report of testimony offered and evidence submitted at any hearing.

In the hearing of the appeal the court shall be confined to the record as certified to it. The court shall determine the rights of the parties in accordance with this act, and may affirm, reverse, vacate, or modify the action of the certifying authority complained of in the appeal. The court shall certify its judgment to the parties to the appeal or take such other action in connection therewith as may be required to give its judgment effect.

SEC. 5915.26. Whenever a civil defense certificate is revoked because obtained by fraud or misrepresentation, all taxes which would have been payable had no certificate been issued, shall be assessed with maximum penalties prescribed by the law applicable thereto.

SEC. 5915.27. No civil defense structure shall be considered an improvement on the land on which the same is located for the purpose of real property taxation, if and from the time that a certified copy of the civil defense certificate shall have been filed in the office of the county auditor of the county in which the same is situated, and so long as such civil defense certificate shall be in force.

SEC. 5915.28. No civil defense structure or equipment shall be considered as "used in business" for the purpose of personal property taxation.

SEC. 5915.29. No civil defense facility shall be considered as an asset of any corporation in determining the value of its issued and outstanding shares or the value of the property owned and used by it in Ohio for the purpose of the franchise tax.

SEC. 5915.30. Where for reasons of national defense, a structure constructed by an industry which is included on the list of critical industries as furnished by the federal civil defense administration, which is located underground or in such similar fashion so as to provide superior protection against enemy attack, that portion of the cost of such structure attributable to such added protection shall not be considered in determining the value of such structure for purposes of property taxation.

SEC. 5915.31. The state director of civil defense shall adopt and promulgate and may amend or rescind rules, regulations, and standards, consistent with this act, to govern the issuance of civil defense certificates and carry out the purposes of this act. For such purpose the state director of civil defense is an "agency" and such rules, regulations, and standards are "rules", within the meaning of the Administrative Procedure Act; but the state director of civil defense is not to be considered an "agency" within the meaning of said act for any other purpose.

The state director of civil defense also has power to adopt rules governing the procedure and internal management of the certifying authority.

ROGER CLOUD,
Speaker of the House of Representatives.
PAUL M. HERBERT,
President of the Senate.

Passed May 28, 1957.
Approved June 17, 1957.

C. WILLIAM O'NEILL,
Governor.

The sectional numbers on the margin hereof are designated as provided by law.

OHIO LEGISLATIVE SERVICE COMMISSION,
CHARLES W. INGLER, *Director.*

Filed in the office of the Secretary of State at Columbus, Ohio, on the 17th day of June, A.D. 1957.

I hereby certify that the foregoing is a true copy of the enrolled bill.

TED W. BROWN,
Secretary of State.

File No. 284. Effective September 16, 1957.

CITY OF CINCINNATI,
Cincinnati, Ohio, February 24, 1960.

MR. CHET HOLIFIELD,
Chairman, Military Operations Subcommittee,
House Office Building, Washington, D.C.

DEAR CONGRESSMAN HOLIFIELD: Your letter of February 10 with respect to certain civil defense information for your proposed civil defense hearings in the near future, comes at a time when we, here in Cincinnati, are attempting to solve the many complex problems relating to our civil defense structure.

It is my sincere hope that the few comments I have made in answering your request will prove of some assistance in the vital work you are doing in this particular field of national security.

1. The information desired would be reflected in building permits issued, since the city ordinances require that a permit be issued for a shelter construction requirement. To date, only two such shelters have been constructed.

2. No public buildings have been specifically modified to provide shielding from fallout. However, many public buildings in Cincinnati have been inspected and marked as available for public shelters.

3. The Ohio Valley Civil Defense Authority has had plans for an underground structure for 2 years, but local funds have not been available for construction purposes. As an alternative, the emergency center for OVCDA and the alternate site for emergency government for the city of Cincinnati have been provided by utilizing the Miami University at Oxford, Ohio, for this purpose (30 miles from the center of Cincinnati).

4. Not at the present time. A program for an underground garage under Fountain Square is in the planning and test stages. Preliminary conferences have been held with officials of OCDM with a view of utilizing this structure when completed for dual purposes. Nothing concrete has been achieved by these conferences, since preliminary estimates would indicate a considerable outlay of Federal funds which OCDM could not commit at this time.

5. None.

6. Evacuation-reception centers have been prepared for evacuees leaving the city in the event of an emergency. The question of radioactive fallout protection in these centers is a matter of local requirements. OVCDA has been working on this problem directly with the counties and communities. No emergency supplies have been stocked; however, a plan to provide such emergency supplies has been ready for implementation for some time. It will be necessary for the Federal agency to provide some specific items, especially emergency food supplies. Medical stockpiles—emergency hospitals have been stockpiled or prepositioned as in the case of the hospitals. It is estimated that the evacuation-reception plan for this area will care for the entire population. A copy of the plan which has been furnished to each householder (300,000) in this target area, is attached hereto for your information.

7. It is my considered opinion that one of two things must occur in any change of Federal policy to achieve greater protection, whether fallout or general civil defense:

(*a*) A broad expensive Federal public-education program so designed that it will alert the individual citizen to his responsibility in providing himself with all the necessary ingredients for his protection. The present policy is neither "fish nor fowl". Since 1950, when Public Law 920 came into effect, it has always been too little, too late. It has had a diluting effect since the education program did not reach the great mass of our population. Depending upon local government to provide large sums of money for public education, even if possible, would be frowned upon locally as a massive "propaganda" program rather than one of education. For example: It is estimated that local authorities would have to provide and expend about $250,000 each year to do a massive job. This is more than twice the entire budget locally for all civil defense needs for the entire county. Obviously this is an impossibility for local authorities to bear, no matter the importance of civil defense.

(*b*) Change the entire present concept of civil defense responsibility from the local authorities to a Federal system similar to the National Guard of the United States. This responsibility can be passed on by the Federal Government to the several States and they in turn could operate a civil defense agency at each target level. Thus, the State receiving the necessary funds from the Federal Government could organize, control, and operate these several target area organizations. The local authorities, cities and counties would cooperate with such agency, just as they do now in cooperating with the National Guard.

SUMMARY

Whether we adopt shelter, evacuation, a combination thereof, or any other concept that may be necessary in the light of ever-changing weapons systems, civil defense cannot become a living structure at the local level until positive leadership is accepted by the Congress and the administration itself.

The present national program has had little or no effect on my city. The reason is quite obvious, too much reliance on the Federal policy of "guidance." The cities do not need guidance—they need leadership which constitutes an "action" program.

I am of the firm opinion that a modern civil defense system for the United States is part and parcel of our overall national security structure.

No longer will World War II concepts be sufficient under intercontinental missiles and chemical-biological warfare. It is too huge a program for a local city to absorb, even in theory. Finally, no matter where or who does the job it will cost great sums of money. The question is—where, who, and how the best job can be done.

Yours very sincerely,

C. A. HARRELL, *City Manager.*

OFFICE OF CIVIL DEFENSE,
Cleveland, Ohio, February 17, 1960.

Hon. CHET HOLIFIELD,
Chairman, House Military Operations Subcommittee,
Washington, D.C.

DEAR CONGRESSMAN HOLIFIELD: Mayor Anthony J. Celebrezze of the city of Cleveland has requested me to reply to your communication of February 10, 1960.

I personally do not know of the existence of a specially constructed fallout shelter existing in any resident's home in the city of Cleveland. Our building commissioner states that no building permits covering the construction of a shelter have been issued in the last 2 years. It is a known fact that many people in the city of Cleveland have selected a shelter area in their residence and many have gone so far as equipping them with emergency supplies.

To my knowledge no public buildings have been modified to provide fallout protection.

Our main control center was established in 1952 in a public owned structure approximately 9 miles from downtown. It is in the basement of a concrete structure, however, the development of megaton weapons have made the use of the structure doubtful. As a result, an alternate location has been selected 38 miles from downtown Cleveland.

With reference to schools and underground parking garages, no structural modifications have been included in the construction of these facilities which would provide adequate fallout protection.

In case of evacuation, studies made by our survival project staff which was coordinated by the State office of civil defense, designate the reception areas for the populace of the target areas. Sufficient reception areas have been assigned to the residents of Cleveland and Cuyahoga County to maintain a ratio of two evacuees to each permanent resident. The space assigned assumes we will house evacuees in private dwellings as well as schools, churches, meeting halls etc. Unless the resident of the rural area has made some provisions for protection against fallout, the lodging areas will provide only the protection that is inherent in the existing structure. As to the stockpiling of emergency supplies, there has been no publicly financed effort to cache supplies in the reception areas.

In regard to your last query, this office is not in agreement with the Federal policy on shelters. It is the concensus of opinion of the people in this office, that Cleveland, being a critical target area, should not persuade our residents to spend money on a shelter that quite obviously will not provide protection from blast, or from the resultant fire storm. In this matter, I am in accord with Dr. Edward Teller, who only recently wrote to me and stated that "We are in need of mass shelters which would accommodate perhaps 1,000 people each. It should also be possible to reach these shelters on foot in approximately 10 minutes or so. Such shelters need not have exceedingly high blast resistance, but would need their own air supply and should be capable not only of resisting fire but also of being constructed so the outside air could be sealed off from the inside for many hours."

In the absence of shelters which will provide the residents of this area protection from blast or heat, we are still of the opinion that evacuation, prior to attack, affords our population the greatest chance for survival. Our residents have always regarded evacuation with a skeptical viewpoint and the emphasis of the Office of Civil and Defense Mobilization on fallout shelters has had a tendency to confuse our people. Nevertheless, you and your committee who are well acquainted with the effects of modern weapons must recognize the worthlessness of fallout shelters in any critical target area. If the general public possessed the data your committee has, I am sure there would be a better acceptance of evacuation and a clamor for a federally financed shelter program.

Your continued interest in this program is to be commended.

Sincerely,

JOHN J. POKORNY,
Director of Civil Defense.

DEPARTMENT OF CIVIL DEFENSE,
Columbus and Franklin County, Ohio, February 26, 1960.

HON. CHET HOLIFIELD,
Chairman, Military Operations Subcommittee,
Committee on Government Operations,
House Office Building, Washington, D.C.

DEAR SIR: After reading the seven questions of your inquiry and formulating some of the answers in my mind, I couldn't help but feel a little embarrassed that we, the American people, have been cognizant of the many suggestions for survival that have been offered to the American people but not near enough has been done in our country for our survival. In lieu of actual statistics, I will try to supply the answers to your questions as honestly as I can from my personal observations and/or feeling of the public pulse as it applies in our community.

1. Although we have no actual statistics on the number of home shelters that have been constructed, we are aware that many people in our community have done something in varying degrees, primarily in basement areas, to enhance their potential survival. Each day we have requests from contractors and other interested persons for a copy or copies of the "Family Fallout Shelter" booklet (MP–15) but they refuse to divulge any further information about it. We find that most people guard this information jealously because of the feeling that others would try to move in and use their hospitality instead of preparing for themselves. Also, I find that many people will not admit that they are preparing in any way since they feel that what they have done is inadequate at this time and does not meet all of the specifications that are recommended. We try to encourage through the news media and speaking engagements to build a block at a time and to add those supplies that must be purchased a little bit each payday in order to get more people started.

Mr. Alan O. Gulker, who is president of Columbus Junior Chamber of Commerce, advised us that they are presently starting on a program in cooperation with the Home Builders Association to establish prototype shelters in various housing projects under construction in Columbus.

2. To the best of my knowledge, no public buildings in our community have been modified to provide shielding from fallout as prescribed by OCDM.

3. The Columbus and Franklin County Civil Defense Main Control Center is located 11.2 miles from assumed aiming point in a semibasement area protected by wings of the building on either side of our particular operational area. However, our office is in the immediate downtown area, also in a masonry constructed basement area.

4. There have been no dual purpose underground structures constructed in our community.

5. As of this date, to the best of my knowledge, there has been no structure modifications incorporated in schools that have already been built or are to be built.

6. We have a plan of evacuation from our community to the adjacent counties which includes a well coordinated police traffic control plan, however, the centers that will probably have to be used for accepting evacuees will be churches, schools, auditoriums, etc. They would provide whatever radioactive fallout protection is obtained in structures of this type without adding additional shielding. They are not stockpiled with emergency supplies other than a few 200 bed emergency hospitals that were stockpiled in those buildings that had available space and met the criteria established for suitable storage. There are adequate evacuation reception centers in our adjacent counties to receive the number of persons that will want to evacuate if we should have time for this action.

7. I feel that the policy, based upon the voluminous studies should be more specific in pointing out how many lives can be saved by this relatively simple precautionary measure. I feel that, in addition to the Federal Government, the State and local government should also initiate, to whatever degree possible, the lead in guiding the public to the acceptance of this theory and that we can get more followers if we who are dedicated to this program will teach by doing.

In addition to the questions which you have asked, I feel that a more reasonable approach to total preparedness for the probable warning time will be found in the concept of every individual having available at all times, as a part of his personal belongings, a miniature kit which could afford fallout protection, such as a container for emergency water supply and purification, ration bars and some personal cover. Those persons who should have time to evacuate will have the life-saving kits with them and if there should not be sufficient time to evacuate, regardless of where we find ourselves, should we survive the blast, fire and initial radiation effects, we will have the means of surviving the immediate danger until perhaps the level of radioactivity is reduced to the point where we could receive assistance.

Also, I would like to suggest, knowing full well that this is not intended as a point of destructive criticism, but feeling very strongly that the ideals of civil defense acceptance by the public, as well as local governments, will be better received when our national leaders reaffirm publicly their faith in the civil defense program. This can best be accomplished by personally doing those things which are advocated for the public. Since human nature parallels that of a river in taking the course of least resistance, many people are reluctant in following the preparedness program of civil defense. This reluctance will remain as long as those persons in high positions constantly criticize and condemn civil defense and its leaders without offering any constructive suggestions. This criticism by a person in high authority fool-hardily lends the helping hand to the citizen who cannot quite make up his mind about his own survival.

Sincerely,

RUSSELL E. PENNELL, *Director.*

MIAMI VALLEY CIVIL DEFENSE AUTHORITY,
Dayton, Ohio, February 16, 1960.

Hon. R. WILLIAM PATTERSON,
Mayor, City of Dayton,
Dayton, Ohio.

DEAR MAYOR PATTERSON: With reference to the questionnaire sent to you from the Congress of the United States, regarding civil defense.

Question No. 1. We personally know of three. Two by the inventors of the NURAD Underground Shelter and my personal shelter in the basement of my home, and perhaps there are other prepared shelters that I have no knowledge.

Question No. 2. To the best of my knowledge, none.

Question No. 3. No.

Question No. 4. There are six in this area: Talbott Garage, Hubers Garage, West First Street Garage, SWS Garage and the Biltmore Hotel Garage.

Question No. 5. Not to the best of my knowledge.

Question No. 6. Yes. Evacuation centers have been prepared, per the Ohio survival plan, and would provide adequate protection from radiological fallout. The Ohio survival plan takes into consideration the evacuation, and the Re-

source Manuals list the available food supplies and the number of people that can be taken care of in any given area.

Question No. 7. The Federal Housing Administration will not approve a fallout shelter on a new loan for a new home. It can only be approved by an improvement loan. Ninety percent of the homes being built today are of the slab-type construction and it is felt that if the Federal Housing Administration and the Veterans' Administration would make it mandatory that new homes being constructed would have fallout shelters as a requirement for loan approval, a great step would be achieved in providing fallout shelters.

With reference to the last sentence of the last paragraph, it is felt that congressional support of the President's budget for OCDM, is a major factor.

Very sincerely yours,

STEWART SHELDON, *Executive Director.*

OKLAHOMA CIVIL DEFENSE,
Oklahoma City, Okla., March 7, 1960.

Hon. CHET HOLIFIELD,
U.S. Representative, House Office Building,
Washington, D.C.

DEAR REPRESENTATIVE HOLIFIELD: Your letter to the Honorable J. Howard Edmondson, Governor, dated February 10, 1960, has been referred to me for the answers to your questions concerning fallout shelters.

Since the national shelter policy was announced by Gov. Leo Hoegh, considerable interest in shelters has been generated in the State of Oklahoma. This office has filled over 10,000 written requests for the family fallout shelter pamphlet (MP–15). In addition, many more have been requested by telephone.

The answers to your questions are herewith provided:

1. It is estimated that over 400 shelters have been constructed in the State of Oklahoma since the national shelter program was announced. Many of these were constructed primarily for tornado protection, but the additional factor of fallout protection was included.

2. A study of the requirements for modification to accomplish shielding from fallout, in existing buildings, has been recently completed in the city of Tulsa. It is anticipated that some such modification action will result in that city. To the best of my knowledge, no specific action in this respect has actually been accomplished.

3. The State civil defense agency does not have an underground control center. We are presently working with the Governor's committee to accomplish such a control center in a new State office building. It is anticipated that this construction will include the necessary provisions to place a portion of the cost under the provisions of the Federal contributions program. Current operations plans are being modified to provide for the State government relocation site to be at Oklahoma State University at Stillwater, Okla. There presently exists sufficient basement facilities at OSU to accommodate the administrative function of State government. New construction is expected to include additional basement construction which will facilitate the legislative emergency government function.

4. None exist at the present moment. Plans are under consideration for underground parking facilities at the Tulsa County Building. The major problem confronting the county officials is the lack of funds to accomplish such underground parking facilities, and to fulfill the additional civil defense purpose. Similar plans are under study for underground parking under the proposed State office building and adjacent areas thereto.

5. No public schools have been provided additional fallout protection. A great interest in this field of endeavor has been shown. Numerous inquiries have been made of this office concerning financial assistance in this field of endeavor. To the best of my knowledge, there is no provision for financial assistance to public schools for this purpose. This is an area worthy of investigation. However, such action should be coupled with civil defense.

6. No evacuation-reception centers have been prepared in the State of Oklahoma. Facilities have been studied concerning the capability of certain areas to accommodate an evacuation movement. Present facilities are sufficient in most instances studied except, for fallout protection. Presently, to answer this problem, a second evacuation movement will be required.

7. Federal policy should provide for low-interest loans, amortization of construction costs as an income tax deduction for the individual, and specific guidance materials for engineers, architects, and construction companies should be provided. Fallout facilities should be required for all new GI and FHA loans on new construction.

Additional guidance in the fallout shelter program can well be provided in the fields of engineering, architecture, and construction. Most State civil defense agencies lack the staff personnel to provide specific information, which is frequently requested by architects and engineering firms. An engineering handbook, which should include schematic drawings, factors, et cetera, should be prepared for wide distribution to those individuals and firms responsible for the inclusion of fallout shelter facilities in new constructions. A recent experience of this agency proved most embarrassing, when I was unable to provide such specific information to one of the leading architect firms in Oklahoma City. Such information was requested for use in planning the new Federal Reserve Bank building. General information was available, but specific technical information was not.

It is our understanding that a new pamphlet will soon be released for this basic purpose. The pamphlet "Fallout Shelter Surveys: Guide for Executives," (NP–10–1) provides some basic data. This same type information, however, should be provided in a technical handbook form, for reference purposes, by specialists in the field of construction planning.

There should be legislation introduced also, which will permit the individual to amortize the cost of shelter construction, as an income tax deduction. The law presently permits corporations and business firms to amortize such costs, but does not include the individual. The individual family construction offers as great a problem. The initial cost is prohibitive, unless such funds can be borrowed at a low rate of interest. Secondly, the provision for amortizing such costs must be provided, if the ordinary family is to be included.

You may be assured that in Oklahoma a great interest has been generated in shelter fallout protection, since the inception of Gov. Leo Hoegh's policy. That interest has not been implemented into immediate action, due primarily to the cost for such shelter. The people in Oklahoma have indicated the firm belief that such construction should be the responsibility of the individual and family. However, notwithstanding this fact, they are still faced with the problem of meeting the costs.

In addition to the fallout protection, in Oklahoma the same shelter provides a greater feeling of security when the threat of tornadoes develop. By utilizing the tornado protection philosophy coupled with the fallout protection aspects, we have enjoyed our greatest success. Throughout the operations of the civil defense program in Oklahoma, our immediate objective remains the natural disaster problems. Our long-range objective remains meeting the hazards caused by enemy action.

With reference to item No. 5, as stated above, it should be mentioned that the city of Tulsa and county of Tulsa, through the Tulsa City-County Civil Defense Administration, Independent School District No. 1 of Tulsa County, and the United States of America, through the OCDM, have entered contract No. CDM–PF–60–68. This contract provided for one of the prototype shelters to be constructed in the Nathan Hale High School, Tulsa, Okla. The contract provides for the dual use of this shelter, as well as the other aspects included in prototype shelter agreements. This shelter is being designed to accommodate 500 people.

For your information, you will find enclosed a copy of a sheet from the January 13, 1960, Daily Oklahoman, showing the fallout shelter. For your further information, you will find enclosed a copy of the legislators' successors certificate prepared, printed, and distributed through this agency.

I trust these answers will serve your purpose. Should you desire or require additional information, please call on this office for same.

Sincerely,

THOMAS M. BRETT, *State Director.*

THE CITY OF OKLAHOMA CITY,
Oklahoma City, Okla., February 22, 1960.

Mr. CHET HOLIFIELD,
House Office Building,
Washington, D.C.

DEAR MR. HOLIFIELD: In reply to your inquiry we submit the following answers regarding questions on fallout protection:

Answer 1. In the past 2 years our building department records reveal that 62 building permits were issued for construction of cellars. We have no measures of determining what percentage of the permits issued would fall under the category of fallout shelters.

Answer 2. To our knowledge no buildings have been modified to provide shelter from fallout.

Answer 3. At the present time our local government does not have an underground control center but consideration will be given to one in future governmental building construction.

Answer 4. We have no underground structures serving a direct civil defense purpose at this time.

Answer 5. Our public school system has not incorporated any structural modification nor has plans for any structural fallout protection in future plans.

Answer 6. We have no evacuation reception centers in the Greater Oklahoma City area.

Answer 7. We believe no immediate changes in Federal policies regarding fallout protection are needed at this time; however, continual research and development should be carried on to provide the latest radiation protection as weapon systems are improved.

A national shelter program as proposed by OCDM has recently become activated in our city. We are presently working on an agreement to construct a prototype shelter for display and research purposes. OCDM has provided us with literature designed to promote interest in the public for construction of home-type fallout shelters.

Yours truly,

JAMES H. NORICK, *Mayor.*

OFFICE OF THE GOVERNOR,
Salem, Oreg., March 8, 1960.

Hon. CHET HOLIFIELD,
Chairman, Military Operations Subcommittee of the Committee on Government Operations, House of Representatives, Washington, D.C.

DEAR REPRESENTATIVE HOLIFIELD: In reply to your letter of February 10, I will first give below some of my comments with regard to the influence the Federal shelter policy has had on civil defense in Oregon.

It seems to me that the Office of Civil and Defense Mobilization is using a practical approach in making survival guidance available to citizens with special emphasis on inexpensive fallout shelters. There is manifest throughout this State, measured by editorial comments, an increased awareness of the need for nonmilitary defense preparations. I believe too, that it is apparent the individual citizen is accepting the fact that he must do his part in attaining preparedness for himself and family and that the best place to start is in his own home. This is evidenced by the demand on the State and local civil defense organizations for copies of the booklet, "The Family Fallout Shelter," and also for personal guidance. I must admit, however, that I do not know the extent to which this education and information program has resulted in the actual construction of fallout shelters by individuals in this State. For widespread activity of people to undertake the construction of fallout shelters, I believe there would have to be more fear of war than presently exists in the United States.

I have approved an Oregon shelter policy for furnishing guidance to the people, a copy of which is attached. You may note from paragraph H of this policy that we are recommending that fallout shelters be provided in the construction of new State buildings. We have under consideration a fallout shelter survey of State-owned buildings to determine what facilities for fallout protection already exist in each building and the best ways of improving and utilizing these facilities. A comprehensive study has already been completed to determine the shelter requirements for the population of Oregon if congregate shelters should be used in all areas.

The answers to your specific questions follow [questions deleted]:

1. Factual information on this is lacking; probably not too many have been constructed. I would estimate several dozen only.

2. None at present.

3. The State civil defense agency does not have an underground control center.

4. None.

5. None, that I know of.

6. (*a*) There are approximately 150 emergency welfare centers located in every county of the State which could provide care for evacuees. For the purpose of clarification, an evacuation-reception center is called an emergency welfare center in the Oregon civil defense operations plan. The emergency welfare center may be an area containing a few blocks of a large city or an entire city or town with its surrounding environs. An emergency welfare center has structures and other facilities where evacuees can be housed, fed, clothed, registered, and furnished other disaster services until they can be resettled. Facilities for these functions will be found in schools, church halls, auditoriums, civil and community buildings, and individual dwellings located in the emergency welfare center.

6. (*b*) There are no stockpiles of emergency supplies. We do not believe it is practical to stockpile emergency supplies in the emergency welfare centers. We will use the normal supplies of necessary items which, in most cases, are readily available. We have firm plans for providing additional emergency supplies, from sources within the State, to the emergency welfare centers as the needs arise.

6. (*c*) The lodging sites of the emergency welfare centers in each county are usually large buildings such as schools, church halls, auditoriums, etc. Many have basements which could give a measure of protection from fallout.

6. (*d*) Emergency welfare centers have been designated to receive and care for approximately 600,000 people.

7. I do not think any change in Federal policy is necessary. However, the provision of additional Federal funds by the Congress for the construction of more prototype fallout shelters would make the program more effective. There is only one prototype fallout shelter programed for Oregon.

Sincerely yours,

MARK O. HATFIELD, *Governor.*

OREGON SHELTER POLICY

A statement of shelter policy of the State of Oregon, prepared and adopted by the civil defense advisory council, to be implemented by the Oregon State Civil Defense Agency, is quoted herewith:

"In order to assist the people of the State of Oregon to determine what measures are recommended for obtaining protection against the effects of nuclear weapons, it is stated that the officially adopted shelter policy for this State is as follows:

"(*a*) Fullest cooperation and support to the Federal Office of Civil and Defense Mobilization in furthering the national shelter program.

"(*b*) Continuation of an active and progressive public information program, to develop an understanding by the people of the necessity for them to voluntarily provide for themselves shelters adequate for their protection against radioactive fallout.

"(*c*) Continuing emphasis on the fact that evacuation of people from the evacuation areas of target areas affords the best protection for them if warning time is considered sufficient by those in authority to put the operation into effect.

"(*d*) Emphasis on family fallout shelters, adapted to the size of the family, and congregate fallout shelters, which should be voluntarily improvised or constructed in existing buildings by all people in Oregon other than those residing in the evacuation areas of target areas. This applies to rural areas as well as communities.

"(*e*) Encouragement to those constructing new buildings in the evacuation areas of target areas to incorporate in the buildings congregate shelters which include a considerable factor of blast protection.

"(*f*) Encouragement to those constructing new buildings (congregate dwellings, industrial and commercial facilities, Government buildings, individual housing), outside of the evacuation areas of target areas, to incorporate in the buildings adequate fallout shelters for those employed or housed in the buildings.

"(*g*) Encouragement to the people to visit the prototype fallout shelters that will be constructed by the Federal Government in several places in Oregon.

"(*h*) Recommendation to the Board of Control that funds be provided for the inclusion of adequate fallout shelter, for personnel housed or employed in the structure, in all new State buildings constructed outside of the evacuation areas of target areas.

"(*i*) Provision of all possible assistance, other than financial, and guidance to the people in this State for providing the means to protect themselves from fallout.

"(*j*) Continuation of an accelerated program to develop in the State an effective monitoring system for the detection of radiation."

COMMONWEALTH OF PENNSYLVANIA,
SECRETARY TO THE GOVERNOR,
Harrisburg, March 2, 1960.

HON. CHET HOLIFIELD,
Chairman, Military Operations Subcommittee of the Committee on Government Operations, House Office Building, Washington, D.C.

DEAR CONGRESSMAN HOLIFIELD: Governor Lawrence has asked me to reply to your recent shelter questionnaire. The answers to the various questions raised are set forth below.

1. A number of Pennsylvania families have constructed home shelters of various types on a do-it-yourself basis. In addition, several homebuilders now incorporate shelters in the houses they build. It is estimated that the number of home shelters within the State is between 50 and 100.

2. Insofar as we know, no public buildings in this Commonwealth have been modified to provide protection from fallout. However, plans for a 50-man community shelter to be constructed in the State office building in Pittsburgh are now nearing completion. In addition, our State council of civil defense in cooperation with the U.S. Atomic Energy Commission, is currently studying the feasibility of incorporating fallout shelter provisions for State employees, as well as an emergency operational control center, in an underground garage, which the Commonwealth Government plans to build here in Harrisburg.

3. Our State council of civil defense now maintains an operational control center in the basement of the main Capitol Building here in Harrisburg. Qualified engineers are of the opinion that design of the building, combined with the low level location of the center, offer very good fallout protection.

4. We are unaware of any structures within this State specially designed to serve a dual purpose, including shelter protection. However, several underground storage facilities, primarily for record protection purposes, have been constructed within the Commonwealth. In addition, at least one industrial concern has constructed blast shelters for use by its employees.

5. To date, no Pennsylvania schools have undertaken major structural modifications aimed at protection from fallout. However a large number of educational institutions, notably those under Commonwealth control, have surveyed their buildings to determine the availability of fallout protection within them. In many cases, this has been found to be appreciable. In addition, several Pennsylvania school districts are very seriously considering the incorporation of shelters in new schools now in the design stage.

6. Under the State civil defense operational plan, each county of the Commonwealth has designated a town which serves as an emergency reception center. Usually several other towns are also designated as reception subcenters. While fallout protection has not been the major determining factor in selecting the centers, a number of the buildings which will be used for reception purposes do provide a fair degree of protection from fallout.

7. If appreciably greater fallout protection is to be achieved, we believe that greater incentive must be provided by Federal authorities. Among other things, the public must definitely be told whether or not immediate protection from fallout is an absolute necessity.

In closing, we may add that we have noted, during the past 18 months, a marked increase in public interest in fallout protection. To meet the demand for information on the subject, our State council of civil defense is now completing three special shelter exhibits.

These are in the form of three truck trailers, each fitted out as a full-sized fully equipped family fallout shelter. During the next 12 months, these will be displayed at a number of points within each county of the Commonwealth. By this means, we hope to take the shelter story to the people, as we do not believe that many of them will come to see prototype shelters constructed at a limited number of points, even though such exhibits do have definte value.

Trusting we have given you the information desired, and with kindest regard, I am,

Sincerely yours,

OTIS B. MORSE.

ERIE COUNTY CIVIL DEFENSE,
Erie, Pa., February 18, 1960.

Mr. CHET HOLIFIELD,
Chairman, Military Operations Subcommittee, House Office Building, Washington, D.C.

DEAR MR. HOLIFIELD: I regret that I do not have more assuring answers to the questions you ask in your letter of February 10, 1960. I will list the answers to the questions in the same order that you asked them.

1. There are only a very few home shelters in Erie. Those that we know about are of the lean-to type and probably not too adequate for protection from radiation.

2. No public buildings in this city have been modified to provide sheltering from fallout.

3. Our local civil defense agency does not have an underground control center.

4. No dual civic-civil defense purpose underground structures have been constructed in this city.

5. No structural modifications have been incorporated in any of our public schools.

6. Evacuation centers have been prepared by survey, designation, and by assignment of trained personnel. These buildings would afford inadequate protection against radiation (assuming levels of 500 roentgens or more). These are not stocked with emergency supplies. They could house 16,000 persons, or more. Effective protection (1/100) would be given to only a small percent of this number.

7. Leadership by the Federal, State, county, city, and school organizations in this field would certainly be the most effective means of stimulating individual action in their preparations of fallout protection. An exemption or rebate in tax payments would probably stimulate action for certain classes of people. Laws mandating action would probably be the third most effective way of accomplishing this action.

Thank you for your continued interest and support of the civil defense program.

Sincerely,

DAVID H. PARMENTER, *Executive Officer.*

CIVIL DEFENSE,
Harrisburg, Pa., March 10, 1960.

[Questions deleted]

1. None. Yes.
2. None.
3. Yes; for emergency use only.
4. None.
5. None to date.
6. No.
7. No answer given.

CITY OF LANCASTER,
OFFICE OF THE MAYOR,
Lancaster, Pa., March 2, 1960.

Mr. CHET HOLIFIELD,
Military Operations Subcommittee,
House Office Building,
Washington, D.C.

DEAR MR. HOLIFIELD: I am answering your letter of February 10 with the following comments:

1. To our knowledge no home shelters have been erected in the city. From the county, this office received a few inquiries about shelter construction but so far only one has been completed. We are making it a practice to follow up these inquiries in order to determine the status of the shelter program in the city and county.

2. There are 16 buildings in the city designated as shelters. These were selected several years ago by a joint building contractor and engineering staff. These shelters, as yet, have not been modified to provide shielding from fallout.

3. Our local civil defense organization has no underground control center. A site about 5 miles from the perimeter of the city line has been selected to serve as a satellite control center. The building has been approved by the area director and it is expected to be put into use this coming spring.

4. No.

5. Each school in the city, working closely with our civil defense organization, has assigned shelter areas in the buildings but these shelters serve primarily as protection against blasts, not fallout.

6. (*a*) Yes, in accordance with our target complex survival plan.
(*b*) No.
(*c*) 25,000 to 30,000.

7. So long as the people remain unconvinced about the danger of fallout little attention is paid to any shelter construction program. Therefore, the Federal policy should be directed to a nationwide intensified public information campaign through all available means: that is, daily papers, periodicals, radio, television, and exhibits. Publications issued by the OCDM do not reach a sufficient number of people. Information in whatever form it may be conveyed to the public, must leave no doubt in the mind of anyone about the possibility of radioactive fallout. Furthermore, as an inducement or incentive for constructing shelters, an arrangement similar to the matching fund program should be inaugurated. Finally, all public buildings, particularly new projects, should be provided with underground fallout shelters that might serve a dual purpose; namely, protection, and commercial utilization with the prospect of yielding some revenue.

Very truly yours,

THOMAS J. MONAGHAN, *Mayor.*

CITY OF PHILADELPHIA,
CIVIL DEFENSE COUNCIL,
Philadelphia, Pa., February 18, 1960.

Hon. CHET HOLIFIELD,
Chairman, Military Operations Subcommittee,
House Office Building, Washington, D.C.

DEAR SIR: Mayor Richardson Dilworth has asked me to reply to your letter of February 10, 1960, and more specifically, to answer the seven questions enumerated therein.

(1) We have no definite figure on the number of home shelters which have been constructed by Philadelphians since the inception of the home fallout shelter program, but we have had several thousand specific requests, mail and telephone, for copies of the Fallout Shelter Construction Booklet. In other words, a goodly number of Philadelphians have taken the trouble to ask personally or in writing, for this booklet. What fruits it has borne beyond the growing awareness of the problem, we have no way of knowing at this time. Additionally, we have distributed this book in quantity, approximately 10,000, to meetings and groups throughout the city.

(2) There are no public buildings in Philadelphia which have been modified to provide shelter from fallout of which I have definite information.

(3) Our Civil Defense agency does not have an underground control center per se, but our main control center is in the reinforced concrete basement of a modern masonry building and is approximately 15 feet below the surface of the level of the earth.

(4) No underground structures having a dual civil defense purpose have been constructed in Philadelphia—notwithstanding my personal recommendations for underground buildings of all kinds (hospitals, apartment houses, and the like)—and my recommendation of long standing that a multipurpose underground parking garage, main control center and public shelter, be constructed at the Independence Hall Mall. There are many persons interested in this project in Philadelphia, but there is no indication of the availability of funds for this purpose.

(5) To my knowledge there have been no structural modifications for fallout protection in public schools, or private or parochial for that matter in Philadelphia.

(6) Several years ago evacuation was dropped as a feasible civil defense tactic for Philadelphia; consequently, we have no plans for evacuation-reception centers, etc.

(7) I believe that the following changes in Federal policy would be helpful in forwarding this program in Philadelphia, for example: Further implementation of the joint responsibilities aspects of Public Law 85–606, together with funds for the purpose of sharing administrative and other civil defense costs.

I believe further that Federal funds for the construction of a tripurpose underground parking garage, main civil defense control center and public shelter at Independence Hall Mall would provide the greatest impetus to, and interest in, the civil defense program in Philadelphia. Additionally, Federal funds and equipment for radiological defense would be highly beneficial. Locally, we simply do not have the funds or the equipment to do a first-class job in developing our radiological defense, although this must be recognized as one of our greatest needs.

In conclusion, if this office may be of service in any way to the public hearings about to be conducted by your committee, please be assured of our enthusiastic and complete cooperation.

Sincerely,

PHILIP KLEIN.

OFFICE OF CIVIL DEFENSE, COUNTY OF ALLEGHENY,
CITY OF PITTSBURGH,
April 5, 1960.

CHET HOLIFIELD,
Chairman, Military Operations Subcommittee,
Committee on Government Operations, Washington, D.C.

DEAR CONGRESSMAN HOLIFIELD: Your letter addressed to the mayor requesting information relating to the construction of shelters for protection against radioactive fallout in the event of a possible enemy attack has been transmitted to me for reply.

The answer to each of your first six specific questions is "No."

So far as the last question is concerned I believe Federal policy must reflect the conviction of the legislative and executive branches of the Government of the need for greater fallout protection for the people of Pittsburgh. This reflection might take the form of—

1. Adequate financial support for Federal civil defense legislation (Public Law 85–606).
2. Requirements for shelter in Federal installations and projects supported by Federal funds including revisions and amendments for construction projects already approved but not completed.
3. Civil defense preparedness requirements for industry contracting with the Federal Government and its agencies.
4. Greater pressure placed by Federal Government upon States to increase degree of preparedness within the several States.

Very truly yours,

J. B. SULLIVAN, *Director.*

YORK CITY CIVIL DEFENSE,
York, Pa.

[Questions deleted]

1. No permits have been issued.
2. None.
3. No.

4. No.
5. No.
6. No.
7. I believe the Federal Government must educate the public to the point that they must realize that shelters are necessary or we will not get anywhere with the idea.

CHARLES H. WEAVER,
Director, York City Civil Defense.

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS,
STATE COUNCIL OF DEFENSE,
Scituate, R.I., February 25, 1960.

Hon. CHET HOLIFIELD,
Chairman, Military Operations Subcommittee of the Committee on Government Operations, Washington, D.C.

DEAR MR. HOLIFIELD: Your letter of February 10, 1960, requesting information on construction of shelters for protection against radioactive fallout in the event of a possible enemy attack was given to the undersigned by His Excellency Christopher DelSesto, Governor of Rhode Island, for reply.

It is my opinion that the impact of the OCDM public educational program concerning the hazards of radioactive fallout is now beginning to reach the people and to cause them to become concerned about the subject of fallout protection.

The State Council of Defense has been conducting a very active educational program in this subject since the family fallout shelter booklet was published in June of last year; and it is my firm belief that this program is now starting to produce results, not necessarily by construction of home shelters, but by providing fallout protection by shielding in many of the homes of our State.

In answer to the specific questions requested in your letter, I submit the following:

1. Two civil defense home shelters have been constructed in the State and we are in the process of contracting for the construction of another one in a typical one-family home in the metropolitan area of the State. This shelter will be available for inspection by the public. In this way, we hope to stimulate new shelter construction in the homes in the State.

2. No public buildings have been modified to provide shielding from fallout. However, we are working on a plan to modify the State capitol to provide this necessary shielding.

3. The main State civil defense control center, located outside the metropoitan area, is not underground. However, a secondary control center has been established in the subbasement of the State capitol which is underground.

4. No underground structures having a dual civil defense purpose have been constructed in the State.

5. Fallout protection, in the form of structural modification, has not been incorporated in any of our public schools.

6. Sixty-two evacuation-reception centers have been designated within the State for use by evacuees. These reception centers are not stocked with emergency supplies, but our civil defense plan provides for the rapid supplying of these centers in the event of an emergency. Protection against radioactive fallout is limited to that protection afforded by normal construction.

7. I firmly believe that in order to achieve greater fallout protection for the people of our State, it will be necessary for the Federal Government to provide Federal contributions for the construction of shelters in the homes as well as public buildings.

The need for home shelters was studied during the writing of our State survival plan. A very comprehensive study was made of the location of all our people. From this analysis, we developed a plan for the location of all community shelters that would be required to provide fallout protection.

The cost of this type of shelter program makes it prohibitive from the standpoint of the State. I am convinced that Federal funds will be necessary to implement this type of shelter program.

Sincerely,

JOHN M. MCGREEVY, *Director.*

PROVIDENCE CIVILIAN DEFENSE COUNCIL,
CONTROL CENTER,
Providence, R.I., March 1, 1960.

HON. CHET HOLIFIELD,
Chairman, Military Operations Subcommittee,
Washington, D.C.

DEAR MR. HOLIFIELD: Reference is made to your letter of February 10, 1960, to the mayor of Providence, on the subject of fallout protective measures. The information which you requested numbered according to your questions is as follows:

1. Building permits issued in the past 2 years reflect no construction of home shelters.
2. None.
3. No.
4. No.
5. No.
6. Evacuation reception centers have been designated. They do not provide adequate protection against fallout nor are they stocked with emergency supplies.
7. (*a*) Provide some form of tax relief for those who have shelters constructed both in homes and commercial buildings.
(*b*) Provide States with matching funds for construction of mass shelters.
(*c*) Further implement H.R. 85–606 by provision of funds for administration and personnel. This would enable greater local promotion of shelter construction.

Very truly yours,

WALTER E. AHEARN,
Colonel, U.S. Army (retired), Director.

THE STATE OF SOUTH CAROLINA,
CIVIL DEFENSE AGENCY,
Columbia, S.C., March 10, 1960.

HON. CHET HOLIFIELD,
Chairman, House Military Operations Subcommittee of the Committee on Government Operations, George Washington Inn, Washington, D.C.

DEAR MR. HOLIFIELD: Your letter of February 10, to Governor Hollings concerning fallout shelters in South Carolina has been referred to this agency.

You will note that few of your questions can be answered affirmatively for this State; principally because civil defense in South Carolina has, for all practical purposes, become really operational only since the assumption of office of Governor Hollings in January 1959. Consequently, those items covered in your questionnaire are generally still in the organizational and planning stages.

Yours very truly,

CHARLES B. CULBERTSON,
Director of Civil Defense.

Following are answers to questions submitted by chairman, Military Operations Subcommittee, to Governor Hollings:

1. We have official records of only three home shelters having been constructed in the State to date. There are definite indications that others have been, or are being, constructed, however, judging from the considerable number of requests made upon this office by private citizens throughout the State for shelter plans and specifications, information as to the purchase of blowers and filters for shelters, and general information pertaining to fallout and the effectiveness of shelters. The home shelter program as we see it, is largely one of education. An estimate of its effectiveness may be made from the fact that to date this office has mailed approximately 11,000 home shelter plans in response to requests from individuals and community groups. There is definitely a public awareness within the State of the dangers of radioactive fallout, and with continuing effort on the part of civil defense personnel, statewide, to push this program and with the recent introduction of prefabricated shelters, do-it-yourself construction, time-payment plans and FHA loans bringing costs into the range of ordinary citizens, it is reasonable to anticipate a significant increase in shelter construction in South Carolina in the near future.

2. Officially, no public buildings have been modified to provide shielding from fallout. Here again we expect a change in the future as a result of our

educational program. Already shelter surveys, including designation and marking of public and private buildings for emergency shelters, have pointed up this requirement which in time will unquestionably be rectified by modification of selected public buildings at community expense entirely, or jointly utilizing Federal funds on a matching basis.

3. The State civil defense agency does not have an underground control center at present. Future plans, based upon availability of funds contemplate construction of such an installation for the State. This, perhaps, can be accomplished sooner, and with greater economy to the State, by incorporating provisions for an underground control center into new State government construction programs.

4. The project of designating selected underground structures as emergency shelters has already commenced in the State. The results cannot be determined at this time due to the fact that the majority of our local civil defense organizations are still in the early stages of organization with priority of effort placed upon recruiting and training of personnel. As organization progresses to the publication of survival plans the resources survey will then receive first priority. At this stage designation of dual-purpose shelters will be effected.

5. At the present time no structural modifications have been incorporated in public schools. The past major emphasis at the national level upon evacuation as the principal passive defense method did not encourage this type planning. There is, however, reason to believe that in view of the concern over tornadoes and earthquakes, as they effect public school structures, the problem of providing fallout protection may well be grouped with natural disasters for future consideration in this respect.

6. The State operational survival plan assigns a mission of evacuee reception and care to 10 counties in the State; 27 other counties are assigned secondary missions of evacuee reception and care under conditions of limited evacuation resulting from little or no attack warning. In addition four counties have been designated to receive evacuees from adjoining States. A total of 22 State parks have also been designated as reception areas and are currently being prepared to receive and care for evacuees. The 10 primary sites were selected because of their safe distance from probable target areas, and the fact that they lie outside probable lines of adrift of radioactive fallout from targets in this and adjacent States based upon prevailing meteorological conditions. It is not contemplated that these areas will be stocked or provisioned since this is the responsibility of other services of civil defense at both State and county levels. These selected reception areas are capable of accommodating the population of the State plus evacuees from other States as agreed upon. Lacking prepared fallout shelters, these areas can provide only the minimum fallout protection offered by existing conventional construction present in the areas.

7. It is recommended that the following changes be made in Federal policy to achieve a greater measure of fallout protection in this and other States of the Union:

(*a*) Liberalize Government loans and discount rates to encourage private construction of fallout shelters.

(*b*) Offer inducements in the form of income-tax writeoffs to individuals and industries undertaking shelter construction utilizing private funds.

RICHLAND COUNTY CIVIL DEFENSE COUNCIL,
Columbia, S.C., February 23, 1960.

Hon. CHET HOLIFIELD,
Chairman, Military Operations Subcommittee,
Washington, D.C.

DEAR SIR: Your letter of February 10, addressed to Mayor Bates, was turned over to me for reply.

Attached hereto are the answers to the questions you asked, numbered the same as the questions.

We do not believe an adequate civil defense can be obtained by passing laws, but can only be the result of convincing the public that the need exists, without using scare tactics. Conflicting and exaggerated statements cannot accomplish this desired result.

Sincerely yours,

W. SLOAN BRADFORD, *Chairman.*

1. Only one so far as we know.
2. None.
3. No.
4. No.
5. No.
6. No. State survival plan directs them to counties only.
7. There are many of these, but the ones listed below would help to some extent.

(*a*) Publish only factual findings as to danger of fallout. Leave scientists' controversies to professional publications. No one knows what to believe when we read so many conflicting statements.

(*b*) Allow deduction on Federal income tax returns for expense of constructing shelters, or for improving existing shelter. This should apply to owners of all types of property.

(*c*) Devise some method of distributing civil defense literature so that it will reach a greater part of the public. The States and their subdivisions do not have the means to accomplish this, although OCDM expects them to do it.

CITY OF CHATTANOOGA,
Chattanooga, Tenn., February 26, 1960.

Congressman CHET HOLIFIELD,
Chairman, Military Operations Subcommittee,
House Office Building, Washington, D.C.

DEAR CONGRESSMAN: In reply to your letter of February 10, we are happy to provide answers to your questions as follows:

1. One underground home shelter has been constructed, and four or five basement type are under consideration. Information has been given to housing authority for consideration. No data available to date as to whether it has been included in new building. A considerable number of homes have basements that have built-in areas that would give excellent protection.
2. No public buildings have been modified to provide shielding from fallout.
3. Our civil defense organization does not have an underground control center. We would like to have one if we can find means of providing funds.
4. No underground structures have been constructed.
5. No fallout protection, in the form of structural modifications, in public schools, yet.
6. Preparation of evacuation reception centers are still in the planning stages. No protection from fallout has been provided in the support areas to date.
7. Continued education and information showing the need for protection from fallout. It is believed the one prototype family basement shelter to be built in the Chattanooga area will create a great deal of interest. It is felt that the Federal Government should contribute more toward building control centers for target cities. The national shelter plan seems to be sound and would be cheaper in the long run, however a great many people feel the Government should give more aid in their construction. A policy requiring everyone to build a shelter would be the answer, giving more assistance to those who were not in a position to build their own, such as financial or long-term loans with low interest.

I hope these answers will provide you with the necessary information. Please feel free to call on us whenever I may be of service.

Very truly yours,

P. R. OLGIATI, *Mayor.*

MEMPHIS-SHELBY COUNTY, CIVIL DEFENSE COMMISSION,
Memphis, Tenn., February 25, 1960.

Mr. CHET HOLIFIELD,
Chairman, Military Operations Subcommittee,
House Office Building, Washington, D. C.

DEAR MR. HOLIFIELD: Your letter of February 10, 1960, to Mayor Henry Loeb, city of Memphis, relative to the study of civil defense being made by your House Committee in Government Operations, regarding the construction of shelters for protection against radioactive fallout in the event of an enemy attack has been referred to me for reply and the following information is submitted [questions deleted]:

1. Five have been constructed in the city-county and about the same number are in the planning stage. Three of the five already built and all of those in the planning stages have been constructed and/or planned for in the present year.

2. None.
3. No.
4. No.
5. No.
6. A few communities in outlying areas have made varying degrees of preparation for operation as reception centers. None of the centers provide adequate fallout shelter and none are stocked with emergency supplies.
7. (*a*) To achieve greater fallout protection for the people of this area the Federal policy should be one of cooperation with the State, and its political subdivisions on a financial basis, similar to, but not to the same extent, as the interstate highway program, possibly on a matching fund, rather than 90–10 basis.

(*b*) If "a" above, is not considered feasible, then financial assistance should in any case be provided to cities for the construction of fallout shelters where residents are nonowners of homes and who are in low income bracket group. One or two shelters to a block. Unless some such provision is made these people, in whatever city, will never have protection against fallout. They cannot afford such a standby luxury and ironically, most of them are vital to the production of the sinews of war in their respective cities.

(*c*) It would be helpful all around if Federal, State, and local laws could be passed prohibiting the construction of any new homes, commercial or business houses, municipal or State buildings, schools or churches, unless they include a minimum shelter to protect the occupants from radioactive fallout. For example, 2 percent of a new house would go for the cost of its shelter. This amount could be turned back to the owner over a period of time through tax exemption.

(*d*) The national shelter plan does not take into consideration the people traveling on our highways, who, too, would need shelter from fallout in case of attack.

For example, it is estimated that 10 percent of our 180 million people, in approximately 30 million vehicles, are constantly traveling over the highways in the United States. Where would these 18 million go at warning of threat of attack? Would they continue their movement toward large cities, from which people are evacuating? This brings into focus the need for a massive shelter building program under the Interstate Highway System, which should have started at the same time as the interstate highways when both could have been or could be constructed concurrently at a considerable saving in cost to the Federal Government.

In this connection please find attached herewith the November 1959 issue of the Optimist International magazine, containing an article by the undersigned entitled "Highways to Survival," pages 14 to 17, that briefly discusses evacuation but places the emphasis on shelters, that in effect, advocates a change in Federal shelter policy from one of example, advice, and assistance to that of massive construction.

Hoping the foregoing will be helpful as well as informative, I am,

Sincerely,

JOHN F. SOMERS,
Lieutenant Colonel, USA (Retired), Director.

DIVISION OF DEFENSE AND DISASTER RELIEF,
Austin, Tex., March 4, 1960.

Hon. CHET HOLIFIELD,
Chairman, Military Operations Subcommittee,
Committee on Government Operations,
House Office Building, Washington, D.C.

DEAR CONGRESSMAN HOLIFIELD: Gov. Price Daniel has asked that I answer your inquiry of February 10, regarding the influence of the Federal shelter policy in our State. I will answer the questions in the order they were presented in your letter.

(1) I do not know how many home shelters have been constructed in Texas. There are infrequent newspaper articles on home shelter construction by an individual homeowner, but the housing developers and builders are just beginning to be interested, in this State, in the promotional possibilities of including shelters in new homes. An instance in Austin is the University Hills development, which will include a multipurpose shelter room in the dream home that is to

be given away as a promotional device for the development. I know of no firm plans on the part of the builder to include shelters in any unit except the dream home.

The Office of Civil and Defense Mobilization has entered into a contract with the city of Austin to build a model family fallout shelter, with Federal funds, attached to the caretaker's home in one of the city's large parks. OCDM has also entered into a similar contract with a private citizen to build a model family shelter in Denton.

(2) I know of no public buildings in Texas that have been modified to provide shielding from fallout.

(3) The State of Texas does have an underground civil defense and disaster relief control center that was built several years ago.

(4) There are, of course, underground structures in our metropolitan areas that could possibly serve a dual civil defense purpose, but I know of none that have been constructed with that objective.

(5) I know of no instance where fallout protection in the form of structural modifications has been incorporated in public school plants. The prohibitive cost of such modifications is the reason most often offered as the reason for this.

(6) No evacuation-reception centers have been prepared within this State. In our planning, we have designated reception and care county areas in which evacuees from urban target areas could seek shelter, but the only shelter these areas offer is the existing public and private housing facilities. These reception and care areas are not stocked with emergency supplies.

(7) A program of greater Federal participation in the cost of fallout shelter construction would result, I am sure, in more shelters being built in Texas. Personally, I had much rather see our Nation apply the huge amount of money a national shelter construction program would cost to building up and maintaining a position of invincible strength. In my opinion, money spent in that direction buys the best and cheapest fallout protection. The threat from fallout is one of the facts of contemporary life, and I do believe that there should be a continuing Federal program alerting our citizens to the dangers of fallout, teaching them protective measures, and assisting them in providing shelter for their families and communities—such as the present OCDM prototype shelter program.

Sincerely yours,

JAMES H. GARNER, *State Coordinator.*

THE CITY OF FORT WORTH, TEX.,
February 25, 1960.

Hon. CHET HOLIFIELD,
Chairman, Military Operations Subcommittee,
House Office Building, Washington, D.C.

DEAR SIR: I have your letter of February 10, regarding shelter facilities for protection from radioactive fallout. There has been some activity during the past 2 years on the Federal level concerning the shelter program, radio and TV programs, and the distribution of some printed material. The printed material provides some planning facilities as well as construction facilities. The program seems, however, to have been designed primarily for sections of the country that have basements, and does not have much information for sections that do not have basements such as our own area. In this area, people generally feel that the cost is almost prohibitive. We understand that funds are available through FHA for financing such a project, but there has been no detailed informatoin as to how the financing should be done. It might be helpful it more information of this type was made available to the general public.

The following is submitted in answer to your questions:

1. We have no knowledge of any shelters being built for homes in this area.
2. There have been no public buildings remodified to provide shielding from fallout. Building construction in this area does not seem to lend itself to modification on any major scale.
3. Local civil defense agency does not have an underground control center.
4. There have been no underground structures such as parking garages, etc., constructed in this area suitable for fallout protection.

5. There have been no structural modifications incorporated in any of the public schools for fallout protection.

6. An evacuation reception area is designated and some planning carried out. The program in the reception area, however, is a State function and reception centers have not been provided with adequate fallout protection.

7. Changes in Federal policy that might be helpful would include more information on FHA financing which might include more liberal terms for financing than normal construction provides. Also, a program adapted more to the needs of areas not having basements, and since civil defense is part of a national defense plan, perhaps consideration be given to a more liberal matching-funds program for cities developing adequate control centers, since this facility might be for use by agencies other than local.

I trust the above is the information required.

Yours very truly,

T. A. McCANN, *Mayor.*

OFFICE OF THE MAYOR,
Houston, Tex., February 26, 1960.

Hon. CHET HOLIFIELD,
Chairman, Military Operations Subcommittee,
House of Representatives,
Washington, D.C.

DEAR MR. HOLIFIELD: Reference your letter of February 10 attached, I am enclosing the answer to your questionnaire that were prepared by Mr. Floyd L. Miller, director of Houston civil defense.

If I can be of any further service, do not hesitate to call me.

Sincerely,

LEWIS CUTRER, *Mayor.*

FEBRUARY 23, 1960.

REPLY TO INQUIRY ABOUT CONSTRUCTION OF SHELTERS AGAINST RADIOACTIVE FALLOUT

In reply to your memo dated February 16, we are returning the attached with the following explanation on the above subject:

Question No. 1. No building permits have been issued. Three home shelters have been constructed.

Question No. 2. None.

Question No. 3. No

Question No. 4. No.

Question No. 5. No.

Question No. 6. No.

Question No. 7. We feel that fallout shelters, for the evacuees of Metropolitan Houston, are of great importance; however, this responsibility lies between the State and Federal civil defense program. The change would have to be accomplished by the policy established by the State and Federal program.

FLOYD L. MILLER, *Director.*

STATE OF UTAH CIVIL DEFENSE CORPS,
Salt Lake City, March 9, 1960.

Hon. CHET HOLIFIELD,
Chairman, Military Operations Subcommittee, House Office Building, Washington, D.C.

DEAR MR. HOLIFIELD: In reply to the questionnaire forwarded to Governor Clyde, he has requested that I answer these questions as accurately as possible.

1. This is difficult to determine, but the closest estimate we can at the present give is around 50.

2. None.

3. Yes; also a special air circular to filter out radiation.

4. There are probably quite a large number of underground structures that could be used in a dual purpose for civil defense shelters, but as of the present time this program has not been pursued by our State office.

5. None.

6. Each county seat in the State has been designated as an evacuation reception center under control of our welfare services, but there has been no stockpiling of emergency supplies.

7. We feel that there should be more financial help on community shelters.

I trust this information is satisfactory to you, I remain,

Sincerely yours,

LEONARD A. HIGGINS, *Director.*

SALT LAKE CITY CIVIL DEFENSE,
Salt Lake City, Utah, February 24, 1960.

Hon. CHET HOLIFIELD,
Chairman, Military Operations Subcommittee of the Committee on Government Operations, House Office Building, Washington, D.C.

DEAR SIR: Your recent letter to the mayor was referred to me for an answer since he has just recently been appointed as mayor of Salt Lake City and therefore would not be very familiar with civil defense work in this area. This reference is made to your letter of February 10.

In answer to question No. 1, our building permit information would reflect about 50 shelters, either built or under construction at this time. However, many homes have apparently good shelters by adding a small amount of material which was not reflected in the building construction. A large amount of lean-to shelters for instance have been added to basements affording considerable protection outside a bomb drop area.

Question No. 2. None of our public buildings have been modified to provide shielding from fallout although one is in the planning stage.

No. 3. Our civil defense control center is housed in rented buildings above ground.

No. 4. Negative.

No. 5. No structural modifications have been made for fallout protection in our public schools at this time. However, these schools are becoming interested in such a plan.

No. 6. Available reception centers have been prepared paperwise for use by evacuees in case of emergency but only on a mobile basis and they are not stocked with emergency supplies.

No. 7. With respect to Federal policy, I believe that all Federal buildings should have fallout protection in the form of shelters. I know that new buildings are supposed to provide shelters but I have found adequate shelter space in old Federal buildings which could provide shelter. Plans are now being drawn to build a new Federal building in Salt Lake City. I hope this building will provide shelter space against fallout as it would provide a great inducement for all other agencies to follow suit.

Salt Lake City is not a critical target area and, therefore, it has been difficult for us to get our leaders interested in civil defense at this time. But we do have an operation here and believe that in the near future we will be able to improve our position.

I have had the pleasure of listening to you on various occasions and know that your interest in civil defense is real and only hope that you will be able to obtain more congressional support as Chairman of Military Operations Subcommittee.

Very sincerely yours,

Lt. W. F. HENINGER,
Director, Civil Defense.

STATE OF VERMONT,
DEPARTMENT OF PUBLIC SAFETY, CIVIL DEFENSE DIVISION,
Montpelier, March 11, 1960.

Hon. CHET HOLIFIELD,
House of Representatives, Washington, D.C.

DEAR MR. HOLIFIELD: In reply to your request submitted to His Excellency, Gov. Robert T. Stafford, relative to the shelter program in Vermont, I am pleased to submit the following information.

At this time, only one underground home shelter has come to our attention. Many inquiries and requests for plans have been submitted to our office. We feel it is likely that many family shelters exist and we know nothing about them. Our own personnel has established leadership in this field by taking the

necessary precautions in their own homes. The contract has just been let for one Federal prototype home shelter in Vermont.

To our knowledge there have been no buildings modified to provide shielding from radioactive fallout. We do not have an underground control center.

Several churches have recently built underground additions. They will serve as shelters in a disaster. There have been no measures taken for protection in any of the schools in Vermont.

In connection with the extent of our evacuation, reception plans are limited to open air facilities. Rural church groups and home demonstration clubs are equipped to do mass feeding and private homes will provide lodging.

The allocation of additional Federal money will do the most to assist us in developing civil defense in Vermont. The true facts of the threat of radiation for educational purposes is vital. I believe the thorough, durable training and education must begin in the school system as a compulsory measure.

Thank you for the opportunity to present these facts on our shelter program in Vermont.

Very truly yours,

WILLIAM H. BAUMANN,
State Director of Civil Defense.

MONTPELIER, VT.

[Questions deleted]

1. None that I know of.
2. None.
3. No.
4. None.
5. No.
6. No.
7. I am at a loss as to how to account for the general apathy on this subject. It almost seems to me that the general public is living in a "fool's paradise."

ELBERT B. COLBURN, *Mayor.*

COMMONWEALTH OF VIRGINIA,
OFFICE OF CIVIL DEFENSE,
Richmond, February 15, 1960.

Hon. CHET HOLIFIELD,
Chairman, Military Operations Subcommittee,
House Office Building,
Washington, D.C.

DEAR MR. HOLIFIELD: In reference to your letter of February 10, 1960, which was referred to me on February 12 by Gov. J. Lindsay Almond, Jr., the following information is submitted as requested [questions deleted]:

1. Ten home shelters.
2. None.
3. Yes.
4. None.
5. No.
6. The Commonwealth of Virginia has never felt that it would be feasible to consider the evacuation-reception centers because congregated facilities of magnitude that would house a large number of evacuees at rural Virginia does not exist. Therefore, the State in planning for its obligation to receive evacuees from Washington, D.C., and other target areas has proposed to house these persons in homes. If the homes in the reception areas would have a 2-week food supply, we believe that the chance of survival is greater in decentralizing the evacuees to manageable groups into homes where food supplies exist.
7. The interest in fallout shelters by the people in the Commonwealth of Virginia has been high for the past 60 or 90 days. This interest perhaps can be accredited to the family fallout shelter plan recently submitted to the public by OCDM. It would seem that the Federal policy would achieve a greater fallout protection for the people of the State if it was based on an incentive for industry and people to develop: (a) home shelters (b) dual-purpose shelters.

This incentive might be created by such actions as loans for construction and also through some type of an income tax reduction. If there is a need for fallout shelters in this country, through proper educational and incentive programs the objective of shielding our people from fallout could be accomplished in the near future.

Sincerely yours,

DOUGLAS L. MOORE, Jr.,
State Coordinator.

CITY OF ALEXANDRIA, VA., *March 11, 1960.*

Hon. CHET HOLIFIELD,
Chairman, Military Operations Subcommittee,
House Office Building,
Washington, D.C.

DEAR CHAIRMAN: In response to your letter of February 10 concerning the civil defense study in the United States, I submit herewith as far as the city of Alexandria, Va., is concerned, the following replies to your inquiries:

1. To my knowledge under the current family fallout shelter program, one has been constructed by Mr. and Mrs. George D. Sibthorp, 1201 Saint Stephens Road, Alexandria, Va., who have received a special citation presented by the Director of OCDM.

2. The U.S. Post Office Building in Alexandria has equipped a portion of its basement to provide shielding from fallout for a limited period of time. Improvements for this shelter are now in the planning stage.

3. No.

4. None to date.

5. None to date.

6. At this time some evacuation-reception centers have been prepared for use by evacuees in the event of an emergency. The amount of protection, the amount of emergency supplies on hand, the number of people they will at this time protect, is information which should be obtained from the State Civil Defense Office, Lyric Building, Richmond, Va.

7. It is my opinion that we need more Federal leadership in this field and greater Federal assistance financially to accomplish the necessary protection in the event of an emergency. Alexandria is in a "blast" area—probably in the Nation's No. 1 critical target area, and I do not believe that there is sufficient local or State funds available without Federal assistance to accomplish the job necessary for full and adequate protection in the event of an atomic attack. Shelters which will shield from blast in addition to sheltering from radioactive fallout should be constructed in this city, but the cost and the engineering process to accompany this is so great that it is my opinion that little or nothing will be attained without substantial Federal guidance and assistance.

Very truly yours,

LEROY S. BENDHEIM, *Mayor.*

OFFICE OF THE MAYORS,
City of Newport News, Va., February 18, 1960.

Hon. CHET HOLIFIELD,
Chairman, Military Operations Subcommittee,
House Office Building,
Washington, D.C.

DEAR MR. HOLIFIELD: If there has been any encouragement for the construction of shelters for protection against radioactive fallout in the event of possible enemy attack in the State of Virginia, we are not familiar with the movement here. Nor have we been informed of any steps to educate the public in the matter of constructing shelters.

We are familiar, however, with the hazards involved from radioactive fallout and the methods employed in developing improvised protection against this material.

There have been no civil defense home shelters constructed in the city of Newport News nor has any public building in this city been modified to provide shelter from fallout. The Newport News Civil Defense Agency does not have an underground control center. We do not have any underground structures which serve the dual purpose for civil defense and parking garage or other public purpose. There has been no fallout protection provided in any of our public schools.

We understand that evacuation reception centers are the function of the State government and the State office of civilian defense. Certainly this city has made no provisions for evacuation reception centers nor for the protection of these centers against radioactive fallout.

In answer to your question No. 7, it is our opinion that the Federal Government must provide substantial subsidies for the construction of public evacuation centers and for the construction of shelters within cities to provide protection in the event of an attack.

I do not believe there will be many privately constructed shelters in this country, certainly not in this city, until the Government is prepared to lead the way in the construction of some public shelters and for public evacuation reception centers.

Very truly yours,

O. J. BRITTINGHAM, Jr.,
Mayor, City of Newport News.

DEPARTMENT OF CIVIL DEFENSE,
STATE OF WASHINGTON,
Olympia, February 24, 1960.

Hon. CHET HOLIFIELD,
House Office Building, Washington, D.C.

DEAR CONGRESSMAN HOLIFIELD. Under date of February 10, 1960, you wrote a letter to the Honorable Albert D. Rosellini, Governor of the State of Washington. You asked certain questions relating to shelters and fallout. The Governor has asked that I answer your letter.

All home shelters have not been reported to this office, but we estimate that throughout the State there are approximately 200 home shelters.

As to possible buildings being modified to provide shielding. No such buildings have been so modified. We have designated certain public buildings with basements as shelter areas inasmuch as they will provide a certain amount of protection. These buildings are so marked.

Our State does not have an underground control center. However, we have a complete set of plans and have selected a site for such a center. This project will be submitted to the next session of the legislature and I hope we will receive official approval for such construction. State civil defense does have a large communications bus. The bus is equipped with all types of radio communication plus a telephone switchboard. This vehicle can furnish power to handle all equipment in the bus and also lighting facilities for any building which we might take over. It gives us a mobile control center which would be of great value in the emergency.

You further asked how many underground structures having a dual purpose such as parking garages have been constructed in our State. There has been no underground construction of buildings in this State that could serve in a dual capacity. There has been new buildings with basements and subbasements which could be used for shelter, but no underground parking garages.

You further asked if structural modifications have been incorporated in any of our public schools. There have been no structural modifications, possibly because there has been very little recent construction of school buildings. Also, our Department of Public Instruction, together with our school districts, are sorely pressed for funds.

As to evacuation reception centers, we have 12 such areas. The centers are not stocked with emergency supplies other than medical and there is no adequate protection against radioactive fallout. Our plans estimate that approximately 2 million people may be evacuated into these areas. We have had excellent cooperation with the food industry, both wholesale and retail and, with the cooperation of our State department of public assistance, have done much planning toward supplying food as well as clothing to evacuees.

You then asked what changes in Federal policy do we think necessary to achieve greater fallout protection for the people of our State. Our State faced a hundred million dollars deficit going into the last legislative session. Of necessity, it was imperative to raise taxes and slash where possible. As a result, State civil defense operates with a very small staff. The situation is reflected throughout the counties of this State, many of whom are operating with small budgets. The result is that civil defense and other agencies suffer.

The burden, as I see it, rests largely with the Federal Government, both executive and legislative. The Office of Civil and Defense Mobilization has done a good job with the funds at their disposal. We have been supplied with adequate information regarding shelters and the necessity therefor, however, with the small budget at our disposal it is difficult to disseminate this information throughout the State. We are a long way from the Nation's Capital and although the news and national periodicals point to the world tensions, the average person looks to the Federal Government for guidance. I feel that a strong statement of policy by the Congress and a similar statement by the President regarding a shelter program would do much to assist the States to take steps for survival. It goes without saying that the statements should be backed up the adequate financing.

I am hopeful that this letter will be of value to your committee in your considerations and if there is any other information that you desire, please advise.

Sincerely,

CHARLES C. RALLS, *Director.*

SEATTLE-KING COUNTY CIVIL DEFENSE,
Seattle, Wash., February 24, 1960.

Congressman CHET HOLIFIELD,
Chairman, Military Operations Subcommittee,
Committee on Government Operations, 201 George Washington Inn,
Washington, D.C.

DEAR CONGRESSMAN HOLIFIELD: Your letter of February 10 to Mayor Clinton, Seattle, concerning the local shelter program has been referred to me as civil defense director.

Governor Hoegh's statements and policy on the need for shelter against radiological fallout has caused our department to stress this policy where in the past years we have stressed evacuation. Our plan has always included both types of action and will continue to do so, with the shifting of stress from the one to the other.

Now to the questions asked:

1. Both city council and board of county commissioners have passed resolutions exempting civil defense home shelters from payment of fee for building permits. Outside shelters and any basement shelters altering in any way the existing building require permits. A basement shelter has been built as part of the original construction in a new home. This is an excellent reinforced concrete shelter, below ground level, which includes air intake and waste disposal with septic tank, is well equipped and stocked. It is believed a number of other basement shelters have been built but in a more makeshift manner. A contractor has advertised in a local paper. Pamphlets on home shelter have been widely distributed. A prototype shelter will be constructed and on display at the Seattle Home Show, March 5–12, 1960.

2. None modified, but they have been surveyed and plans developed to make best use of existing shelter.

3. Yes. The combined city-county civil defense department has an excellent underground control center designed and built for the purpose. It is reinforced concrete with 4,800 square feet of operational space, plus adequate utilities and decontamination facilities. It has Army Chemical Corps filters with an excellent ventilating system, a 50-kilowatt generator and a 2,500-gallon buried water tank. Capacity of 70 persons with sufficient survival equipment for a 2-week period. Communications equipment is very complete and is on various frequencies including the city department net, the sheriff's net, the county fire districts, RACES (161 volunteers signed up), State control center and adjacent counties.

4. No.

5. Yes. Only one so far. All schools hold drills making use of best available shelter. This is very inadequate.

6. Thirty staging areas in King County have been designated. These areas will provide only minimal fallout protection for approximately 100,000. Forty reception areas have been provided in Skagit, Whatcom, and Snohomish Counties for an additional 200,000 from the Seattle area. The latter will afford fallout protection to only about 75-percent reduction factor for the majority. A large reception area complex has been designated in Chelan, Kittitas, and Yakima Counties, east of the Cascade Mountains for 250,000 or more, by the State.

Emergancy medical and emergency welfare supplies have been stockpiled in 25 locations in King County. A mine located near Black Diamond has been equipped with necessary survival equipment including emergency generator. The main shaft is 20 by 3,000 feet and can accommodate over 3,000 persons.

7. It is believed that if the Federal Government would insist on all new Government buildings containing shelters, and let that fact be known to the public, it would assist in obtaining more public interest and support.

At this time OCDM, region 8, is planning to construct a public fallout shelter in connection with the new freeway now being constructed through Seattle. We are also now in the process of completing arrangements for a prototype shelter to be constructed by OCDM in a Seattle home. This will be open to the public and widely publicized.

Approximately 250 buildings have been surveyed within the central business district and designated as public shelters. These shelters will provided considerable protection against fallout. Few if any are stocked.

Your interest in civil defense is certainly appreciated.

Sincerely yours,

EDW. H. CONNOR, *Director.*

EXECUTIVE OFFICE, THE STATE OF WISCONSIN.
Madison, Wis., February 19, 1960.

Congressman CHET HOLIFIELD,
Chairman, Military Operations Subcommittee of the Committee on Government Operations, Washington, D.C.

DEAR CONGRESSMAN HOLIFIELD: This is in reply to your letter of February 10 in which you request information on the general subject of the construction of shelters in Wisconsin against radiological fallout.

You state that your committee is generally interested in what influence the Federal shelter policy has had on civil defense in our State. I will try to answer your questions as specifically as possible. Much of the required information could be obtained only by a careful survey in each city and community.

Below are listed replies to the questions in the order in which you asked them:

1. We have a record of eight home shelters that have been constructed in Wisconsin. From the number of inquiries our State bureau of civil defense has received, however, I am confident that more have been built and are under construction.

2. There is no record of public buildings in our State that have been modified to provide shielding from fallout. The State department of public instruction is currently recommending to school boards in the so-called tornado belt that cyclone shelters be included in all new school plans. These shelters would afford some degree of fallout protection and with some modification could be made quite adequate.

3. Our State control center has hitherto been operated aboveground. For Opal 60, however, we plan to operate in the basement of the control center. Lack of funds has prevented us from building our own underground control center.

4. We know of no underground structures having a dual civil defense purpose that have been constructed in Wisconsin.

5. We have received a number of inquiries from school superintendents and school boards inquiring as to the feasibility of structural modifications in schools Opal 60, however, we plan to operate in the basement of the control center. having been built to date, although as stated in paragraph No. 2 above, our department of public instruction is encouraging construction of cyclone shelters.

6. Arrangements have been made to use public buildings throughout Wisconsin for evacuation-reception centers. They have not been stocked with emergency supplies.

7. Possibly a Federal tax deduction (one time) might be allowed industry and householders for shelter construction.

Steps are being taken to inform and educate all citizens on hazards of radiological fallout and to give them data on the construction of fallout shelters.

Sincerely yours,

GAYLORD A. NELSON, *Governor.*

OFFICE OF CIVIL DEFENSE,
Madison, Wis., February 17, 1960.

Hon. CHET HOLIFIELD,
Chairman, Military Operations Subcommittee,
Washington, D.C.

DEAR CONGRESSMAN HOLIFIELD: Mayor Ivan A. Nestingen, of Madison, has asked me to reply to your letter of February 10, 1960, relating to the fallout shelter program.

We will answer the questions in the order in which they were presented in your letter [questions deleted]:

1. We have no exact figure on the number of home fallout shelters which have been constructed in Madison. It is not reflected in building permits which have been issued. We do know, however, that there have been many inquiries about the construction of shelters, and somewhere around 40 people have indicated to us that they have done something about it. There has been a general reluctance because of fear of public ridicule.

2. No public buildings have been modified to provide shielding from fallout. However, consideration is being given to the matter of school fallout shelters, and new OCDM criteria are being applied.

3. The city of Madison does not have an underground control center. We do have an alternate control center approximately 20 miles out in the country from the city. The building we occupy does not afford adequate fallout shelter, however.

4. Two parking ramps have been constructed, and one or two others are contemplated. Neither has been specifically constructed with fallout shelters in mind, although parts of the two structures would afford excellent shelter with very slight modification.

5. No structural modifications have been made for school shelters. However, consideration is being given to the construction of a large fallout shelter in West High School as part of a rebuilding program. OCDM has been asked to assist in financing this fallout shelter.

6. The State welfare department has made a survey of the reception area and has determined in detail how many people can be housed in various communities. The site-to-site evacuation plan is predicated upon the capability of the reception areas to care for evacuees. As far as we know, however, nothing has been done either to provide fallout shelters for evacuees in that area or to stockpile emergency supplies.

7. There are two factors which seem to present the principal stumbling blocks in the development of a fallout shelter program. The first is public attitude, and the other is tax relief. As far as public attitude is concerned, until there is a demonstration of general acceptance of the idea that home shelters are needed, there will be little accomplished. This matter of public ridicule must be overcome, and it will take more than press releases to do so. Also, the prototype shelter program whereby shelters will be built by OCDM in private homes at no cost to the householder providing they enter into an agreement to make the shelter available for public viewing and whereby they agree to have a family live in the shelter for 2 weeks is thoroughly unrealistic, and attempts to sell the idea have fallen completely flat. The idea of OCDM putting in such shelters as a means of stimulating public interest is fine, but they are going to have to undertake some kind of a revised approach to the agreement. The second major problem in this field is the matter of tax relief. It will be necessary for householders to be assured that there will not be an increased assessment when they build a shelter and that they will not be taxed for providing a survival capability. This is probably one of the paramount reasons why the shelter program has progressed so slowly. The matter of public attitude is used as a means of explaining away the tax aspects which seem to dominate the thinking of householders.

Another problem dealing with total civil defense but which has a definite bearing on the shelter program is what many people consider a conflicting interest or policy is the matter of evacuation and/or the use of shelters. While there is a definite need for both in a sound civil defense program, the many conflicts in public statements by leaders in Washington has resulted in great confusion in the minds of the public. If there could be some kind of a clearinghouse for public pronouncements so that divergent opinions would be kept within the civil defense family and not aired in public, much of the confusion in the minds of the general citizenry would be overcome. The shelter program has

been suffering because the public does not believe the Federal authorities know what they are doing, or at least are uncertain as to what course of action should be taken. Anything that can be done to give the public assurance that top civil defense planning is predicated upon realistic approaches to the problem would help produce greater confidence in civil defense and that, in turn, would lead to greater participation. The confusion and the question mark in the minds of the general public is probably the greatest problem which needs to be overcome by civil defense. Much of this confusion and uncertainty on the part of the public has come from testimony before congressional committees and other public information which has emanated from Washington. When the Federal Government demonstrates that it knows what it is doing in civil defense matters, there will be much better public acceptance.

Yours very truly,

RICHARD C. WILSON, *Director.*

CITY OF MILWAUKEE,
OFFICE OF THE MAYOR,
February 24, 1960.

Hon. CHET HOLIFIELD,
Chairman, Military Operations Subcommittee,
House Office Building, Washington, D.C.

DEAR MR. HOLIFIELD: In your letter of February 10, you ask what influence has been felt locally from the annuoncement 2 years ago by OCDM that national civil defense policy would include the use of shelters to provide protection from radioactive fallout.

Before answering your specific questions, may I take the opportunity to make some general observations.

It is true that the announcement of the national shelter policy did not create much reaction except among the unfortunately small group that is deeply interested in civil defense; however, among them it formed the basis for considerable study and, hopefully, future action. For example, in Milwaukee it has brought about a study of the shelter possibilities throughout the city, an examination of the practicality of including shelter in new public construction, incorporation of shelter in a new pumping station, and positive plans to build a large shelter within the new public museum building for which ground will be broken shortly.

I believe that the lack of more positive reaction and the paucity of shelter construction lies both in the general lack of interest in civil defense and also in the absence of positive incentives to build fallout protection. The Federal Government has failed to stress the pressing need for the program by extending psychological and financial inducements to demonstrate its concern. For example, the Government might well provide income tax deductions for funds spent for fallout shelter construction, encourage States to do the same, make FHA loans available for this purpose (perhaps interest free in connection with new construction), suggest prohibitions against added property assessments because of shelter construction, provide Federal aid or matching funds for large shelters in public buildings, etc.

The reply to your questions in order:

(1) Although no building permits have been issued for shelter construction in existing homes during the last year and a half, several have been included in new construction. In these latter cases the shelter was probably included to test public reaction and market demand. The public seemed interested but not excited. I feel that the average person is reluctant to indicate that he had built a shelter in his basement for fear of publicity, property taxes, and the simple fact that he would not want his neighbors to think that he was frightened.

On the other hand, there have been some very positive expressions of interest. On December 7, 1959, our local civil defense administration distributed over 200,000 "Home Fallout Shelter" booklets. There were several hundred calls and letters in the weeks that followed from interested people who said they wanted to build a home shelter, wanted information on costs, etc.

When OCDM offered us a basement shelter in a selected home as a part of its "prototype program," 148 applications for this shelter were forthcoming in spite of the Federal requirements that stipulated lengthy public showings, tests, etc. At this time agreements are almost completed for one such shelter. I am sure there could be many more if more Federal funds become available.

(2) Only one of our public buildings has been modified to provide fallout shelter. A city ordinance requires that careful consideration be given to the provision of fallout protection in all new public buildings consistent with the costs involved. The first to be designed under this ordinance was the new south side pumping station now under construction. Partly underground and of heavy concrete construction, this station will offer fallout and considerable blast protection.

If present plans go forward, the city's new public museum to be started in April will have a prepared, complete shelter area for 2,500 people. OCDM is participating in this project under its prototype shelter program.

During 1959, a survey was made to determine the amount of radioactive shelter afforded by existing structures. Although this survey was limited in scope, by interpolation it seemed to indicate that, with slight improvement, most industrial, business, and public buildings could afford a considerable degree of fallout protection. The survey showed that while basements afford a protection factor of only 2 to 4 and therefore would all require basement shelters of the type recommended by OCDM to raise this level an acceptable degree, such basement home shelters could be built at a cost of two to five hundred dollars each.

(3) Our civil defense administration has an underground control center completely equipped with communications, independent water, power, and filtered ventilation. It is not as large as it should be and has not been stocked with food to sustain people for any length of time.

(4) No underground structures having dual defense purposes, such as parking structures, have been constructed in this city. Several proposals have been studied, and in each case the shelter plan was abandoned because of excessive cost and unavailability of Federal assistance.

(5) Although a number of specific projects have been proposed and discussed, no fallout protection in the form of structural modifications has been incorporated in any of our public schools. The main objection was the cost if added to limited construction funds. Also it was discovered that shelter's dual purpose use would be severely restricted by the Wisconsin State Building Code which states:

"No class, recitation, study, laboratory, domestic science, or library room shall have its floor more than 2 feet below grade. Industrial arts rooms, shops, toilet rooms, and other rooms used by pupils (not including playrooms) shall have floors not more than 4 feet below grade.

Studies are currently underway to modify this statute; however, considerable difficulty is anticipated.

(6) Evacuation reception areas have been surveyed (copy of dispersal plan enclosed) and found sufficient to care for all the people likely to evacuate the Milwaukee metropolitan target area. This reception area can provide refuge for over 1 million people—considerably more than are expected to voluntarily evacuate the metropolitan area.

The sole protection from radioactive fallout in reception areas will be ordinary basements, which will afford about the same protective factor (2 to 4) as city basements. These areas are not especially stocked with emergency supplies. It is believed, however, that the tendency of rural families to carry heavy stocks of foodstuffs, plus the fact that a large part of normal food processing and storage facilities already exist in this area, will greatly lessen this problem.

(7) To achieve greater fallout protection, as a minimum the Federal Government should provide financing for adequate fallout shelter areas for large numbers of people, and should prescribe by law the dual-purpose uses to which such areas can be put without interfering with their use in civil defense emergencies.

To assure civil defense preparation by industry, tax incentives and contract preferences should be extended to organizations that provide shelter for personnel, continuity of production through duplication and safe storage of records, provisions for auxiliary power, water, and raw material resources. With a few exceptions, industry today is almost completely indifferent to civil defense requirements because of the indifference of the Federal Government, their biggest single customer.

To encourage construction of residential shelters, the Federal program must provide tax relief and low-interest FHA loans to home and apartment owners.

Civil defense will not be taken seriously by the people until it is taken seriously by the Federal Government and demonstrated by a positive program of inducement and assistance. Statements by the Office of Civil and Defense Mobilization are not enough. Government support of the civil defense of the people must bear a real relation to the military defense of the people; otherwise people

will continue to believe that the civil defense program is quite unnecessary because they can rely solely on the military to prevent war.

A "do-it-yourself" program of the magnitude contemplated by the national shelter policy cannot achieve even a minimum success without strong motivation. That motivation has not been offered by the Federal Government; in fact, confidence in military deterrence has developed a sense of security which has discouraged concern for civil defense.

In my opinion the Office of Civil and Defense Mobilization has done and is doing all that can be expected of it, considering the limited support its program has received from the Congress. If Members of Congress who have access to information not available to the average citizen are convinced that a general shelter program is necessary and give it all support possible, the people will respond. Only then will shelters be built to meet the need.

Respectfully yours,

FRANK P. ZEIDLER, *Mayor.*

WYOMING EXECUTIVE DEPARTMENT,
Cheyenne, February 19, 1960.

Hon. CHET HOLIFIELD,
Chairman, Military Operations Subcommittee,
Committee on Government Operations,
House Office Building,
Washington, D.C.

DEAR CONGRESSMAN HOLIFIELD: In response to your letter of February 10, the following information on Wyoming civil defense is given with the answers numbered the same as the questions listed in your letter.

1. None reported.
2. None reported.
3. No.
4. None reported.
5.
6. Operational survival plan (OSP) provides for eight evacuee reception centers within this State. Emergency supplies are not stocked; reliance on local supply is intended. Use of public buildings for protection against radioactive fallout is planned at this time. The OSP anticipates a maximum of 250,000 evacuees, this and adjacent States.
7. Strong insistance that Federal building be designed to afford maximum fallout protection. It appears that public buildings would be the starting point for implementing this program.

In general, OSP for this State is in consonance with a scattered and less dense population; reliance on individual homeowner protection is stressed, rather than at concentrated efforts common to a metropolitan area.

Sincerely yours,

J. J. "JOE" HICKEY, *Governor.*

APPENDIX II.—CORRESPONDENCE AND SUMMARY OF WHITE HOUSE CONFERENCE ON FALLOUT PROTECTION

CHET HOLIFIELD, CALIF., CHAIRMAN
EDWARD A. GARMATZ, MD.
JOE M. KILGORE, TEX.
MARTHA W. GRIFFITHS, MICH.

R. WALTER RIEHLMAN, N. Y.
JOE HOLT, CALIF.

CAPITOL 4-3121
EXTENSION 5147

EIGHTY-SIXTH CONGRESS

Congress of the United States

House of Representatives

MILITARY OPERATIONS SUBCOMMITTEE
OF THE
COMMITTEE ON GOVERNMENT OPERATIONS
HOUSE OFFICE BUILDING
201 GEORGE WASHINGTON INN
WASHINGTON, D. C.

COPY

January 12, 1960

The President
The White House
Washington, D. C.

Dear Mr. President:

In view of the White House-sponsored Conference on Civil Defense, which I understand was arranged at the request of Governor Rockefeller, I take the liberty of enclosing an exchange of correspondence between Governor Rockefeller and myself on his civil defense proposals for the State of New York. My letter to Governor Rockefeller of July 27, 1959, you will note, is critical of his proposals while commending him for his attention to this vitally important subject.

On the basis of extended studies of civil defense and the effects of nuclear radiation, conducted by the Military Operations Subcommittee of the House Committee on Government Operations and the Joint Committee on Atomic Energy, on both of which I serve, I am convinced that civil defense demands an acceptance of responsibility and an allocation of resources by the Federal Government in far greater measure than has heretofore been evidenced.

As you prepare for the so-called summit meetings, in which disarmament undoubtedly will be a crucial topic of discussion, I hope you will consider this point: that progress in disarmament does not obviate the need for civil defense. In fact, the need for civil defense grows greater because it is the only ultimate insurance against enemy cheating.

The enclosed statement of principles on civil defense outlines this and other points which may be of help to the conferees meeting with you on January 25th.

Sincerely yours,

/s/

Chet Holifield, Chairman
Military Operations Subcommittee

54223 O—60——24

January 12, 1960

STATEMENT OF PRINCIPLES ON CIVIL DEFENSE

Submitted to The President of the United States
by Congressman Chet Holifield

The prime objective of our declared military policy is to deter Soviet aggression, either against the United States or against our allies, by posing the threat of massive nuclear retaliation against the Soviet homeland. It is said that such a threat offers the best hope of preventing either direct aggression against the United States or extremely provocative actions that might also lead to war.

Two key assumptions underlying this nuclear deterrence policy are (1) that the United States would be able to survive a surprise attack and strike back with forces sufficient to cripple the Soviet Union; and (2) that the United States would be willing to accept the consequences of attacking the Soviet Union in response to a Soviet attack against one or more of our allies.

Basic to either of these assumptions is the ability to survive a nuclear attack launched by the Soviet Union; in the first instance a surprise attack, in the second a retaliatory blow, or counter-attack. If it becomes apparent to the Soviet leaders that the United States could not survive such an attack, there is great danger that our threat of massive nuclear retaliation might be discounted or otherwise misunderstood and thereby fail to deter aggressive action on the part of the Soviet Union.

In other words, if the Soviet Union calculated either that a surprise attack would render the United States incapable of effectively retaliating or that the United States would not be willing to accept the probable destructiveness of a Soviet

counter-blow, and thus would not massively retaliate in the event of provocative Soviet action, it follows that the nuclear deterrence policy would not necessarily deter aggressive Soviet actions.

Thus it can be seen that preparations designed to enable the United States to withstand and survive the effects of a possible nuclear attack have a direct bearing on our nuclear deterrence policy. Such preparations not only improve our defensive posture, but they also tend to reinforce and make more meaningful our offensive power in that the use of such power becomes feasible--or at least is not incredible--under certain defined circumstances.

Nonmilitary defense, or civil defense, preparations also serve to reduce the risks inherent in any possible disarmament program and thus may represent the key to successful negotiation of a workable general disarmament agreement. To the extent that civil defense can reduce the effects of a possible enemy attack, it would tend to reduce the advantage any opposing nation might hope to achieve through secret, undetected offensive military forces. At the same time, each nation could develop a substantial degree of protection without creating a threat to the security of any other nation.

It thus would seem practical to gear a phased disarmament program to a civil defense program designed to offset each successive reduction of armaments with added increments of civil defense preparedness.

International inspection of armaments could follow the same pattern, beginning with limited coverage of critical areas and

gradually extending to the type of coverage considered essential to permanent arms control and inspection.

Viewed from this standpoint, the following principles concerning civil defense in the United States can be set forth:

(1) Large-scale civil defense preparedness is essential to national security and to any safe progress in military disarmament. Such preparedness would provide a degree of personal protection which would serve to "insure" our peoples' lives against the risk of cheating by an enemy power during a period of disarmament and thereafter.

(2) A meaningful civil defense program must encompass, on a national scale, all the preattack preparations required to minimize loss of life and to insure the post-attack availability of resources necessary for national recovery.

(3) Responsibility for developing such a program rests with the Federal Government as a part of its Constitutional duty of providing for the national defense.

(4) The States and localities should be called upon to provide maximum assistance to Federal authorities in developing a workable national master plan and in the use of state and local resources, including governmental institutions and personnel, for civil defense emergency and post-attack recovery operations.

(5) The roles and missions of the Nation's armed forces should be recast to encompass a predetermined role in the civil defense field. Such a role should be planned for clearly defined relationships and integrated action with regional and local civil defense and disaster programs.

(6) The first task of national civil defense is to provide protection for the American people from the devastating immediate hazards of nuclear war. Shelter protection from fallout, emergency stocks of basic subsistence supplies, and radiological monitoring equipment are essential for the entire population. Blast protection and protected communications and control facilities should be developed in key areas to insure the continuity of essential governmental operations and to minimize the number of possible blast casualties.

(7) The second most important task of civil defense is to provide a basic framework for the post-attack recovery of the Nation. This task should be performed concurrently with the protective function and should include measures to insure the availability of material resources in the immediate post-attack period for the long-term recovery effort. Standby legislation should be enacted to provide for the necessary economic and industrial control authority and administrative structure, and a Federal stockpile of basic survival and recovery resources

should be created and positioned in properly dispersed or protected storage.

(8) An effective civil defense as outlined above would make the risks inherent in disarmament more acceptable. Civil defense preparedness should be built up in phases geared to each step in the reduction of our military forces.

(9) In the event agreement on arms reduction and control is achieved, a portion of the funds ordinarily earmarked for military purposes should be applied to civil defense needs.

July 27, 1959

Honorable Nelson Rockefeller
Governor of the State of New York
The Governor's Office
Albany, New York

Dear Nelson:

Your personal note transmitting a copy of the report on civil defense was appreciated. I believe you have performed a real public service in sponsoring the civil defense study in New York State and in making public its findings and recommendations. As you know, I have felt very keenly for a long time that the people must be fully informed about the facts of nuclear radiation and the implications of nuclear war for the survival of our country and indeed of all mankind.

In my congressional work as chairman of the Military Operations Subcommittee of the House Committee on Government Operations and as chairman of the Special Subcommittee on Radiation of the Joint Committee on Atomic Energy, I have tried to make public, through investigations and hearings, as many of these facts as possible. Our basic studies and investigations in civil defense, I truly believe, have set the groundwork for a national reappraisal of the tasks that lie ahead in protecting the people and affording a means for national survival in the event of nuclear war. The 1956 report of the Military Operations Subcommittee exposed the fallacy of evacuation as a national civil defense measure and recommended a national shelter building program, the need for which has been recognized by many distinguished study groups, including the Rockefeller Special Studies Project in 1958.

A basic tenet of our 1956 and succeeding reports is the obligation of the Federal Government to provide for civil defense as a part of its broad constitutional responsibility to provide for the common defense. I do not think this premise can be challenged in the face of the terrible and widespread damage that would result from a nuclear attack, and that is why I am concerned about the possible meaning and effect of your State civil defense report.

Assuming the New York State Legislature were to give effect to the recommendations in your report, I see little hope that other states would follow suit. Consequently, there would be no uniform national legislation in this vital area. In an address to the United States House of Representatives on July 15, 1959, I took the liberty of suggesting there is little chance of legislative action in your State.

More important is the question whether it is fair to compel private citizens to take action for their own defense against nuclear attack when the Federal Government has not even begun to acknowledge its responsibilities in this area. I do not discuss here the legal or constitutional questions posed by a program of compulsory shelter protection for individuals and property owners. The problem is too large, the tasks too complicated, the time too short for us to expect that a nationwide shelter system ultimately can be achieved by State and individual action in the manner proposed in your report.

Of course, as the Governor of a great State, you are proposing a course of action within the sphere of your responsibilities. With that no one can quarrel, and indeed you are to be commended for asserting responsibilities where others have been laggard.

The value of your report, as I see it, lies in drawing national attention once more to the civil defense problem; and you have been an eloquent spokesman on this subject which has little popular or political appeal but which is crucial to the nation's welfare. I hope the report will serve the further valuable purpose of alerting the Federal Government to its responsibilities and will not be used as a pretext by those who would relieve themselves of burdensome and costly tasks by attempting to transfer responsibilities to the States or to individual citizens.

I voice these thoughts frankly because of my deep concern. They are not intended in any way to disparage your great public service for civil defense.

Sincerely yours,

Chet Holifield

CHET HOLIFIELD

State of New York
Executive Chamber
Albany

Nelson A. Rockefeller
Governor

August 25, 1959

Dear Chet:

Please forgive the delay in replying to your thoughtful letter about the report of the Special Task Force on Radioactive Fallout. I appreciate very much having your observations which I know will be of considerable interest to the committee presently working on the project.

I do, indeed, feel this course of action is within the sphere of my responsibility for the protection of the lives and health of the people of the State of New York. It is this realization that has prompted my interest, my concern and my action.

It is encouraging to have your comments. Your extensive familiarity with so vital a topic and your total awareness to the danger make your comments all the more meaningful to me.

For your information, enclosed is a copy of the resolution on fallout, unanimously adopted by the Governors at the recent Conference in Puerto Rico.

With best wishes,

Sincerely,

s/ Nelson

The Honorable Chet Holifield
Congress of the United States
House of Representatives
Washington, D. C.

WHITE HOUSE CONFERENCE ON FALLOUT PROTECTION

January 25, 1960

Special Committee on Civil Defense of the Governors' Conference--
Nelson A. Rockefeller, New York, Chairman

Edmund G. Brown, California
George D. Clyde, Utah
Ernest F. Hollings, South Carolina
G. Mennen Williams, Michigan

Ex-Officio

J. Caleb Boggs, Delaware, Chairman, Executive Committee of Governors' Conference
Brevard Crihfield, Secretary of the Governors' Conference

Foreword

The Governors' Committee on Civil Defense met with the President, the Director of the Office of Civil and Defense Mobilization, national military leaders, and other officials of the administration to review the nature of the nuclear hazard and the steps which should be taken for protection from fallout. The meeting was held at the White House on January 25, 1960.

This report contains the remarks of the Federal officials who participated in the conference and of the Chairman of the Governors' Civil Defense Committee, the press release from the President and a Statement by the Special Committee on Civil Defense of the Governors' Conference.

Leo A. Hoegh
Director
Office of Civil and Defense Mobilization

Statement to the Press

January 25, 1960

The White House

The President, in meeting today with the members of the Special Committee on Civil Defense of the Governors' Conference, re-emphasized his support of the statement on National Policy on Shelters, issued at his direction on May 7, 1958. This statement declared that "in the event of nuclear attack on this country fallout shelters offer the best single non-military defense measure for the protection of the greatest number of our people."

The President also referred to his statement, contained in a message to the Senate on August 25, 1959, that "along with our military defense and retaliatory forces, civil defense and defense mobilization are vital parts of the nation's total defense—together they stand as a strong deterrent to war."

The President appreciated the opportunity to confer with the Governors and to discuss with them programs they have under consideration at State and local levels to implement the National Federal Shelter policy. To this end, the President asked the Director of the Office of Civil and Defense Mobilization to continue to act as his personal representative in working with the Governors' Special Committee on Civil Defense.

Statement by Special Committee on Civil Defense of the Governors' Conference

This meeting today with President Eisenhower and the military and civilian leaders of his Administration was of major and sobering significance. We wish all Americans could have participated in it.

The statement of the President this morning and the remarks of the Director of the Central Intelligence Agency, of the Secretary of State, of the Under Secretary of Defense and the Chairman of the Joint Chiefs of Staff, of the Chairman of the Atomic Energy Commission and the Director of OCDM, conclusively established that fallout protection for American citizens, in the event of a nuclear attack against us, is not only feasible but is a requirement of national policy.

General Twining assured us that a fallout shelter program is "essential" to our military defense and to our policy of seeking peace through deterrence of nuclear attack. Secretary Herter, also, emphasized the direct relationship between a fallout shelter program and the successful conduct of foreign policy as well as our military strength and survival. He expressed his "earnest hope that we can make prompt and substantial progress" toward fallout protection for our people.

We are satisfied that, if our foreign policy is to be credible, if our foreign negotiations are to be successful in assuring peace, if our military deterrence is to be effective and our military strength is to be meaningful, if the American people are to have the strength and will to resist nuclear blackmail, if our nation is to survive in the event some aggressor should do the unthinkable and unleash a nuclear attack upon us, then, for each of these reasons, fallout protection for our citizens is imperative.

We believe, based on the presentations we have heard today, that fallout protection for our people is essential, that, while there will be many problems, a very high degree of protection from fallout can be achieved, that it is achievable now and achievable at a cost within the reach of our people and nation. We also believe that the Federal Government should participate more actively in providing the leadership, the financial support and the inducements which must be forthcoming if an effective program of fallout protection for all our people is to be achieved in the near future.

Regardless, however, of the extent of the Federal financial support and inducements that may be forthcoming, we as Governors, feeling keenly our own responsibility, shall do all we can

(a) to educate the public to the fallout hazard and the means of protecting against it,

(b) to help our citizens obtain the fallout shelters which will enable them to survive fallout in the event of a nuclear attack on our country,

(c) to provide fallout protection in state owned facilities, and

(d) to establish a protected seat of state government to assure government leadership and function both during and after any possible attack.

Our immediate task as Governors is, in cooperation with federal officials, to allocate among federal, state and local governments the various responsibilities for a program which will make fallout protection for all our citizens a prompt reality.

We understand that it is the policy of the United States to encourage on a Federal-State partnership basis:

(a) Training of all citizens in personal survival under presently prevailing conditions;

(b) A survey of existing facilities for utilization as fallout shelter;

(c) Construction of home and community type fallout shelters;

(d) Providing such shelters with adequate food and water plus necessary communication and other facilities; and

(e) Participation by citizens in the development and execution of these plans.

We welcome the designation today by President Eisenhower of Governor Hoegh as his personal representative to work with us in agreeing upon a joint program and allocating the necessary responsibilities for its fulfillment.

We are confident that fallout protection for all our citizens can be achieved with vigorous and constructive leadership by federal and state officials working effectively together.

To this task we shall now turn with a confidence that, by discharging this responsibility successfully, we will be making a significant contribution to our nation's quest for a truly meaningful peace—a peace founded on liberty and justice, and trust, among men.

Governor Nelson A. Rockefeller, Chairman
Governor Edmund G. Brown
Governor George D. Clyde
Governor Ernest F. Hollings
Governor G. Mennen Williams

Introductory Statement

NELSON A. ROCKEFELLER, *Governor, State of New York*

Chairman, *Special Committee on Civil Defense of the Governors' Conference*

At their annual Conference in Puerto Rico last August, the assembled State Governors declared their personal and official responsibility, as Governors, for the protection of their people against the hazard of fallout in the event of a nuclear war. In keeping with this sense of responsibility, they unanimously adopted both the report of their Special Committee on Civil Defense and a four point resolution calling for:

First —Vigorous state initiative in a campaign of education about the fallout hazard and protection against it.

Second—Immediate steps by all levels of government, state and local as well as Federal, to assist their citizens to survive radioactive fallout and the related consequences of a nuclear attack upon our country.

Third —State initiative to survey the adequacy of fallout protection in state owned or operated facilities and the steps which should be taken to achieve such protection.

Fourth—State initiative in developing a protected seat of state government to assure government leadership and functioning both during and after a nuclear attack.

This extraordinary resolution showed plainly that the Governors not only recognized the compelling urgency of the problem, but were ready to take initiative in its solution. In the five months since the Governors acted, potentially rewarding and constructive steps have been taken by a number of Governors in their home states. More will be done in the months ahead.

While the Governors at the Conference were willing to take initiative in this matter, it was apparent that the problem of fallout and protection against it involved many considerations of national policy, of the nature and effects of nuclear weapons, and of military policy about which they, as Governors, were, of necessity, not as currently informed as the responsible officials of the federal government. The Governors did not wish to take action on the delicate and difficult matter of fallout protection without assurance from the responsible federal officials that such state action was considered by the nation's leaders in Washington not only as feasible but as an essential element of national defense, a major deterrent to nuclear blackmail or attack and a positive force in the preservation of the peace.

To make sure, therefore, that state initiative would be well and wisely taken, the Governors' Conference unanimously adopted a resolution calling on their committee on civil defense to meet with the President of the United States and key federal military and civilian leaders.

Such a meeting, they believed, would enable them to determine the nature of the threat, the essentiality of fallout protection and its importance to the nation's quest for peace. Such a meeting would also lay the basis for agreement on a common course of action and an allocation of the responsibility for carrying it out.

President Eisenhower, when advised of this suggestion was quick to see its merit and act upon it. The result is this conference today. We are deeply grateful for the time and effort which the President and the leaders of his administration have given to make this briefing possible.

54223 O—60——25

Nature of Threat and Importance of Civil Defense

RELATION TO FOREIGN POLICY

CHRISTIAN A. HERTER, *Secretary of State*

There has been much discussion concerning the present and anticipated military capabilities of the Soviet Union. By their actions and by their statements the Soviet leaders have made it amply clear that on the basis of their powerful military posture, and the threat it poses, they hope to induce the free world to accept the Soviet prescriptions for the settlement of outstanding international issues.

As you know, we will soon embark on a new round of negotiations with the Soviet Union at the highest level; and even before the heads of government convene in Paris in May, representatives of 10 free world and Soviet bloc countries will begin a new effort in Geneva to reach agreement on disarmament. This government together with its NATO allies is now engaged in painstaking preparations for these complex negotiations. We are firmly committed to the proposition that the outstanding issues between ourselves and the Soviet Union should be approached around the negotiating table without threats, ultimatums, or attempts by one side to dictate terms to the other. Our policy is summed up by the words which President Eisenhower used so frequently during his recent trip abroad: peace with justice.

However, our relations with the Communist world since World War II have made clear beyond a doubt that our search for equitable solutions and for a meaningful peace must be predicated upon a strong defense posture of our own. We must assume that weakness on our part, or merely the supposition on the other side that we are neglecting our military defenses, serves neither peace nor the cause of freedom and justice. It is for this reason that over the years we have developed a substantial military capability for retaliation. Until enforceable agreements which are properly safeguarded and effective mechanisms for international law and order provide an alternative means of guaranteeing peace and freedom for the peoples of the world, this military capability will be maintained and strengthened.

A vital part of our military strength for peace must be an effective civil defense program which, in conjunction with our retaliatory capacity, creates a strong deterrent to possible enemy attack upon the United States.

If, despite our earnest efforts at the negotiating table and our defense preparations, we should nevertheless be subjected to nuclear attack, civil defense and measures for fallout protection offer the most practicable and feasible means of saving the greatest number of lives. Numerous studies have shown that such a program would give a substantial portion of our population an excellent chance of surviving and hence provide us the opportunity to continue the fight successfully. In other words, a capacity to retaliate will be reinforced by an effective capacity to survive. And only thus can our defense posture serve as a convincing deterrent.

This conclusion of course has relevance to our foreign policy and to the conduct of our foreign relations. I believe this interrelationship is aptly described in a study made by the

Rand Corporation and presented to the House Committee on Government Operations for one of its recent reports on civil defense. In it we find the following statement:

> "There is an enormous difference in the bargaining ability of a country which can, for example, put its people in a place of safety in 24 hours' notice, and one which cannot. If it is hard for the reader to visualize this, let him just imagine a situation where the Russians had done exactly that and we had not. Then let him ask himself how he thinks we would come out at a subsequent bargaining table."

There is evidence that the USSR is stepping up its civil defense program. Combined with a substantial program for air defense, it provides Soviet negotiators with a good deal of assurance that *their* homeland will be able to withstand attack. A similar assurance with respect to our own country would clearly strengthen our defensive position.

What I have said not only has serious implications for our own military and diplomatic posture; it applies to our NATO partners as well. We participate actively in the various NATO committees which deal with civil emergency planning, and much progress already has been made. Some of our NATO allies and other friendly European countries are further advanced in fallout protection than we ourselves. All of us recognize, however, that further progress is needed before civil defense can achieve its full potential as a deterrent against enemy aggression.

We count on our NATO allies to remain firm in the face of any aggressive threats. An effective program of fallout protection will provide further support for their determination to do so. But if we expect them to take further measures to protect their own populations, we should not lag behind.

As I have said, any additional measures which we can take to minimize the fallout danger will reinforce our country's defense posture, and thereby, its political and negotiating strength. It is my earnest hope that we can make prompt and substantial progress in this direction.

Nature of Threat and Importance of Civil Defense

RELATION TO MILITARY POLICY

JAMES H. DOUGLAS, *Deputy Secretary of Defense*

I appreciate the opportunity to meet with you and discuss civil defense as related to military policy. The call of this meeting and your attendance are in accord with the importance that the Defense Department places upon civil defense.

Several years ago the production of nuclear weapons and long-range bombers by the Soviet Union created a capability to launch a destructive attack on this country. So civil defense and its planning have been concerned with protecting our people against a nuclear attack on the U. S. Up until now, such an attack could have been carried out only by manned bombers and we are confident of at least a few hours warning of an attack by bombers. Today we believe that the Soviets have a very few intercontinental ballistic missiles and that in the next two years they may have a substantial number. Long-range ballistic missiles can deliver large nuclear warheads to a target more than 5,000 miles distant in about half an hour. Our ballistic missile warning system is under construction, but no effective defense against ballistic missiles is likely for some years except our deterrent strength. In the years immediately ahead an attack against us, if it came, would employ both manned bombers and missiles—and even with an effect warning system the warning period would be very short.

Ballistic missiles have an extraordinary impact on our national defense, both military and civil, and are most important to our posture relative to that of the Soviet Union. Today, a very small number of Atlas missiles are operational. These missiles are in regular production—a number of launch sites are under construction—and the accuracy obtained by the Atlas has surpassed our expectations. As the President announced, the last fourteen test firings have on the average been within two miles of their targets. The Soviets have since asserted greater accuracy in their long-range Pacific firing. In the Titan program, since the first four successful tests of the first stage, we have encountered a series of difficulties. We are hopeful of good results on an early resumption of testing. We had similar periods of discouragement with Atlas, Thor and Jupiter programs before those missiles attained their present reliability. Four Polaris submarines have been launched. The missile testing is proceeding satisfactorily and two Polaris submarines with missiles should be operational before the end of the present year.

The Soviets may have a moderate numerical superiority in ICBMs and sea-launched missiles during the next three years. Whether this difference in numbers comprises a real threat to our security is a question which has been studied closely. Our conclusion is that the Soviets could not expect, even with a surprise attack to destroy enough of our retaliatory strike forces to support a rational decision to attack. We believe the Soviets must recognizé that a nuclear attack against us would bring, in retaliation, unacceptable damage to their country and people. This conclusion is based on the fact that our over-all retaliatory power depends upon forces and strategic weapons in addition to missiles, upon constant readiness, improved warning, and vigilance as to the Soviet posture and intentions.

We are determined to maintain peace and strengthen the Free World. We seek to reduce the risks of war and to strengthen our allies of the Free World. And we seek better communication and understanding with the Communist world.

Today, however, and until armaments can be reduced with adequate safeguards, military power is our best assurance of peace. Our strategy and that of our allies is one of deterrence. Our purpose is to make clear that aggression against us or any ally cannot profit the aggressor. To deter an attack against us we must have long-range striking power that can survive even a surprise attack and perform its mission in retaliation. To deter aggression against our allies, our strength and clear intent must convince an enemy that we could and would respond to aggression with force. To permit doubt as to either our power or our intent would invite new dangers to the Free World.

Today the combat readiness of our Army, Navy, Air Force, Marines, and the forces of our allies, provides strong deterrent power. It must continue strong in the future. And I am sure that a strong civil defense program will be an increasingly important element of our deterrent posture. Better protection for our civil population will strengthen the conviction and credibility of our firm policy to meet aggression with force. Also, we must remember that if our policy of deterrence should ever fail, then military power and civil defense are our only assurance of survival.

We know that in the event of nuclear attack our military forces would play an important part in meeting the wide-spread disaster problems that would result.

The primary mission of the military forces is active defense, and this gives us some uncertainty as to exactly which military resources may be available. But we may be sure that if the country suffers a nuclear attack, military personnel and other resources will be available.

This is so not only with respect to our active forces but is also true of all Reserve forces. For example, I am satisfied that portions of the Air Force Reserve airlift would immediately play an important part in the care of casualties, moving of emergency supplies, and in meeting extraordinary demands for air transportation.

We have asked the Joint Chiefs of Staff to review the role and composition of Reserve forces, including their mission in support of civil defense.

The military services have a remarkable record of cooperation with civil authority in peacetime disasters. The services all have plans for similar assistance in wartime. The military continue to support civil defense planning. Technical developments and test results important to civil defense planning are continuously reviewed in the Department and are made available to OCDM. Information on the effects of nuclear weapons and defensive procedures is provided. OCDM representatives have access to data on nuclear weapons effects studies not related directly to military operations.

The Department of Defense is represented on the Interagency Health Advisory Board which was established to advise and assist the Director, OCDM, on emergency medical care planning. Also the Department of Defense provides technical advice and assistance to OCDM in developing and testing certain items of survival equipment.

We have conducted, in conjunction with OCDM, studies toward the development of a single nation-wide nuclear detonation reporting system, to include monitoring and reporting of radioactive fallout information, and bomb damage assessment.

Defense, OCDM and the Federal Communications Commission are constantly working to improve the CONELRAD system, which was developed to deny navigational information to the enemy, but which is essential in providing better dissemination of civil defense information to the general public.

Much has been accomplished under the fine leadership of Governor Hoegh and the leadership in many states. We have learned a good deal of the effect of radiation on people and animals and food. We know how to provide fall-out protection, and what a family can do to provide a shelter and a food supply, which, if accomplished on a broad base, could give strong assurance of national survival against nuclear attack.

We know that even in the event of a nuclear attack the casualties suffered would depend not only on the character of the attack but to a large extent upon the protective measures planned and carried out by our civil population. The self-help shelter plan, with the encouragement of FHA loans, is well conceived. Both the plan and its national importance must be understood by our people if it is to add to our effective defense posture. The Defense Department supports the self-help shelter program and the entire civil defense effort. We are giving attention to practical aspects of a military fall-out shelter program for military personnel and dependents, particularly with respect to what action would be consistent with the civilian protection program. Some shelter experimentation is in progress in the services. One difficulty is that military personnel occupying housing on short tours of duty cannot be expected personally to finance appropriate shelters. Also, the problem of fall-out shelters close to prime targets raises another question.

Today we have the ingredients for a significant civil defense effort. Our problem is one of education and conviction. As I see it, the task is one of communicating an understanding of the threat, and of the practical protective measures that can be taken, without conveying the idea of hopelessness in the face of nuclear attack, or an idea of remoteness of possibility that creates complacence. We do not expect nuclear war, but we know it would be foolhardy not to take the precautions of maintaining an adequate defense, both military and civil. To carry out a civil program will take real understanding and discipline. I believe we are on the right track in providing information, plans and encouragement at the Federal level, and placing primary reliance upon the States to secure effective action by Americans in their home communities in implementing the Federal shelter policy. Civil defense is something that people can do largely for themselves, with assistance in credit, and planning and guidance. We should move toward effective civil defense in this manner, encouraged by example and interest such as yours. And we may be sure that unless there are new and strong assurances of progress towards a surer peace, a strong posture of civil defense will become a matter of increasing urgency.

Effects of Nuclear Weapons and the Nature of the Fallout Hazard

JOHN A. McCONE, *Chairman, Atomic Energy Commission*

At the end of a conflict during which nuclear weapons were used on a large scale, the survivors of the warring powers would face a scene of destruction and contamination without precedent.

Recovery would be a long, tedious process complicated by lingering effects. Adequate preparations will have a positive effect on the number of survivors and the spirit and dispatch with which our people will set about the task. Accordingly, it is necessary and timely that those of us in positions of responsibility give attention to the nature of modern nuclear weapons which can produce profound and widespread effects on the United States and the world, if employed on a massive scale.

The basic facts from which my remarks were prepared are unclassified and are published in the handbook "Effects of Nuclear Weapons" and a brochure, "Comparative Effects Data of Biological Interest," copies of which are available here for your retention.

Let me state at the outset that it is my belief that our nation will continue to be able to control its own destiny after a nuclear attack. This prospect, I believe, is not destroyed by the awful realities of the effects of nuclear weapons which I shall relate to you. It is, however, entirely dependent upon our energetically carrying out a substantial fallout shelter program and associated protective measures.

In the early days one thought of defense against a possible attack from weapons in the 20-kiloton range such as those used at Hiroshima and Nagasaki. The effects of those two bombs have been widely publicized.

Then the megaton range weapons were developed by the United States, Great Britain and the USSR. To give you some idea of the effects of these large weapons, I have a few facts pertaining to a five megaton 50 percent fission, 50 percent fusion, surface explosion. This selection is arbitrary. Substantially larger explosions have occurred in our testing program. Moreover the effects of a weapon will change as its fission product content or height of detonation change.

When a five megaton weapon is exploded, an intensely brilliant fireball forms and grows to about 2.5 miles in diameter. Its initial effects are thermal radiation, blast and prompt nuclear radiation. All are casualty producers.

The thermal radiation or heat emitted within a few seconds by a five megaton surface explosion may produce third degree burns, charring, out to about nine miles from the point of explosion, and second degree burns, that is, burns with blisters, can occur within 11 miles, covering an area of about 380 square miles. At closer ranges, fires will be started. With an air burst we would expect third degree burns to 15 miles and second degree burns to 17 miles.

A great destructive effect of the nuclear weapon comes from the blast. A high pressure wave proceeds at about the speed of sound in all directions from the fireball. For a five megaton surface burst, the blast will destroy typical homes out to about five miles from ground zero and seriously damage them to 10 miles. The blast also contributes to

the fire hazard by overturning stoves, breaking electrical circuits and by damaging structures so as to expose flammable parts to small fires.

Blast will also produce casualties among personnel by blowing fragments of building materials against them, by structurally collapsing buildings, and by displacing the individuals themselves.

The third effect, initial or prompt radiation, affects a limited area, out to less than three miles from ground zero, and for convenience is described as the radiation occurring within one minute after the explosion. Since unprotected personnel out to about 5 to 7 miles would probably die from thermal effects and personnel in buildings out to about 3 to 4 miles would probably be killed by blast, we are concerned with prompt radiation only as it might penetrate blast resistant shelters.

I have given this very quick sketch of the initial effects because they tend to be overlooked in our interest to deal with fallout. The Atomic Energy Commission has participated with other agencies of the Federal Government in a number of studies over the past several years involving a wide range of attack patterns. Speaking generally, attacks directed primarily against population centers produce a much larger number of deaths due to blast and thermal effects than from radiation. When the attack pattern is composed primarily of military bases the converse is true.

Now let's turn our attention to residual radiation or fallout. Residual radiation is that emitted after one minute from the instant of the explosion.

Detonated on the surface, our five megaton, 50 percent fission bomb will produce a large crater drawing up tens of thousands of tons of earth and mixing it with the radioactive fission products of the bomb, which at the moment of explosion are equal in radioactivity to slightly over 250 million tons of radium. This mixture of earth particles and fission products is widely distributed by the winds through which it falls.

For example, the total accumulated dose 18 hours after a surface burst with a fission yield in the megaton range might run to 1,000 roentgens or more in an area roughly 20 miles across at the widest place and 100 miles long, nearly the distance from here to Philadelphia. Closer to the point of detonation the accumulated dose would be higher. Such a radiation dose of 1,000 roentgens or more received within a period of 18 hours would prove fatal to all unprotected persons within one to three weeks. Now, of course, the radiation hazard would extend well beyond the 100 miles in the example I have given. However, generally speaking, we should expect the hazard to decrease as the distance grows.

Following an attack we should also expect to find overlapping of the fallout patterns from separate detonations. That is, areas which might be lightly contaminated by one explosion would receive more fallout from a second explosion in another area and perhaps still more from third and subsequent explosions. The net result is that much of the lightly contaminated area can become heavily contaminated by the later additions. It is conceivable that the enemy could deliver an attack from which virtually the entire land area of the United States would be heavily contaminated because of the overlapping of fallout patterns.

Usually in a discussion of casualties, we are talking about those from acute radiation doses. These are the radiation doses received at high rates over a relatively short period of time.

Making precise predictions of the effect of acute radiation on individuals who may be in a fallout area is presently impossible. Our medical experience in treating acute radiation sickness is quite limited. Generally speaking, the severity and length of acute radiation sickness depends upon the total dose received and upon the rate at which it is

received. To put it another way, the same amount of radiation which would make one very sick if he received the dose in two days might not be immediately disabling if he received the dose gradually over the course of a couple of months. The total dose will, of course, depend upon the length of time spent in the area and available shielding. In addition, the difference between survival and death may depend not only upon the actual dose received, but upon such factors as the particular individual's constitution, other injuries and the adequacy of medical treatment. Those people receiving radiation doses from about 100 to 250 roentgens may show some signs of acute radiation sickness such as nausea and vomiting but almost all of them will survive even with little or no medical care. On the other hand, almost everyone receiving doses over 250 roentgens will certainly suffer from acute radiation sickness and must have medical care. As the radiation dose increases from 250 to 800 roentgens the chances of survival change from a favorable to a very unfavorable position. We expect no survivors from doses greater than 1,000 roentgens.

It is most important to remember that the degree of radiation injury is dependent upon the radiation dose and that even staying in the cellar of almost any type of home will materially reduce the radiation dose and even at dose rates of 500-1000 roentgens may mean the difference between survival and death. Moreover, the intensity of the radiation decreases with the passage of time, rapidly at first and then more slowly. For example, a radiation dose rate of 1,000 roentgens per hour will have fallen to about one roentgen per hour by the end of two weeks.

Now we cannot all remain in shelters full time until the dose rate falls to an acceptable level. There are emergency actions, such as radiological monitoring and rescue work, which will have to be performed. Furthermore, regardless of the state of home preparedness, people will have to come out some day to get more food.

Fortunately, it happens that the body repairs radiation damage, and if people get radiation doses in small increments, they can receive a few hundred roentgens over a period of several months without becoming a casualty. This is not to say that we can indiscriminately expose ourselves in the post-emergency period. Until the authorities say that the situation is safe, we must continue to take advantage of protection in the interest of keeping to a minimum the total radiation dose and attendant long range effects. In the interest of brevity, I shall not discuss long range radiation effects, such as life shortening or genetic effects.

As can be seen, through provision of shelters we can get our people through the death or sickness period of the radiation hazard, accomplishing substantial reductions in numbers of casualties. But this doesn't tell the whole story. If we are to survive as a nation we are going to do it above ground and will require the essentials of life--food, water and medical care. Our normal means of providing and distributing these essentials will be drastically curtailed by a nuclear attack. Substantial programs for local stockpiling of supplies for use in the first few weeks and for reestablishing their production and distribution are almost as essential to our survival as the provision of radiation shelters. Reestablishment of food production and its distribution will probably be the most difficult problem.

In contaminated areas our food animals, as well as people, would require protection from external radiation or they would become casualties. Added to this would be the additional hazard to life--animal or human--from eating contaiminated food and water. Unrestricted consumption of exposed foodstuffs and crops would threaten the lives of all survivors in these areas.

In the heavily contaminated areas a very large percentage of our food animals would perish from the combined effects of external radiation and the consumption of contaminat-

ed fodder. For some months essentially all milk supplies would be too highly radioactive to use even if the cows survived.

Although exposed foods would be suspected of being too highly contaminated to be eaten for periods of weeks, or even months, this contamination would be on the surface of the foods. Most of it can be removed from the surface by washing or peeling. Canned goods in the fallout area, for example, could be made safe by washing the can.

Radioactive contamination would also be in sources of water supply. However, if operative, existing water treatment processes will help reduce the hazard.

When I have talked about food, I have had reference to existing stocks. New production is another matter, one with which the survivors must expect to have difficulty. Much of our valuable agricultural lands will be highly contaminated and crops raised in these areas will take up radioactive materials from the soil. Reclamation of these lands will be a particularly critical matter. The principal problem is that presented by strontium 90 which, unless removed, will contaminate the land and its crops for decades. The most effective removal method as yet is the removal of ground cover or the surface soil. This is time consuming, would require a great deal of labor and equipment and we are left with the problem of disposing of large quantities of contaminated material. Intensive cropping is another method, but here again considerable time is required--about 40 crops to remove the strontium 90 to acceptable levels. One can, of course, shift production of milk and vegetables to uncontaminated land, raising only non-food crops such as cotton and flax on contaminated lands. This has a disadvantage. When contaminated lands are cultivated, the possibility of physical removal of the fallout is gone. The Department of Agriculture has the principal interest in this subject, and is actively working on practical countermeasures.

Survival is also dependent on the manufacture and transportation of goods and the reestablishment of the system for the distribution of food, energy and fuels. The communications upon which we depend so heavily must be restored. Some sort of housing must be provided for the displaced, and so on. The work must be accomplished with fewer resources and with fewer people in the face of some remaining hazards. It will be a grave situation.

Nevertheless, I believe that the post-attack odds may not be insurmountable. What is accomplished before can help greatly afterward. There is a wealth of information in unclassified publications on which any government, community or any family can base plans. The plans will have some grim aspects, but this derives from the nature of war. Failure to make the best use of what is available in advance of the ordeal certainly will not make things easier.

Feasibility of Fallout Shelter (Materials, Designs, and Costs) Standards, and Relation of Fallout Shelter to Radiological Defense, Evacuation, and Recovery

LEO A. HOEGH, *Director of OCDM*

Protection from radioactive fallout is feasible.

The National Policy on Shelters which I announced for the President in 1958 states that, "In the event of nuclear attack on our country, fallout shelters offer the best single non-military defense measure for the protection of the greatest number of our people." This principle has been confirmed by a series of studies and tests, and by the National Academy of Sciences--National Research Council. I quote from a report by the Academy:

> "Adequate shielding is the only effective means of preventing radiation casualties."
>
> "Medical prophylactic and therapeutic measures to prevent death following exposure to large doses of radiation do not presently exist. There is extremely low probability of a major break-through which would provide treatment that would give more than a very small fraction of the protection afforded by a simple shelter . . . ."
>
> "There is adequate technical knowledge to permit a program of construction of effective shelters . . . ."

The principal requirement is that there be a mass of material between the shelter occupants and the radioactive fallout. The more dense the materials, the more effective the protection. Of the dense materials, earth is, of course, the most readily available and the cheapest. An underground shelter is shielded by the earth around it. An above-ground shelter covered with earth provides good shielding. Earth banked around exposed portions of basement walls increases their protective qualities.

Other construction materials such as poured concrete; concrete block; brick; clay tile filled with sand; and steel, fiberglass-reinforced plastics, and treated wood, covered with earth, are relatively inexpensive and provide excellent shielding from fallout.

With our own engineering staff and through contracts, *OCDM* has developed numerous designs of home and community type shelters. The publication, "The Family Fallout Shelter," presents five designs suitable for incorporation in the home. Fifteen million copies of this bulletin have been distributed.

Designs for dual-purpose shelters in schools, garages, hospitals, apartments, and office buildings, are available now or are nearing completion. Further designs for shelters beneath streets, in dome forms, in industrial plants, and in subways are being developed. We are stimulating shelter design by the various materials manufacturers. We seek to develop the most practical and economical dual-purpose shelters for both the home and community.

The American Institute of Decorators has constructed and equipped a shelter, based on our designs, and this month displayed it at the Merchandise Mart in Chicago in connection with the wholesale furnishing show. It is booked for exhibit in the coming months in New York, Detroit, Dallas, Miami, San Francisco, and Los Angeles.

We have also given technical guidance to many individuals and firms who have developed shelter designs, some for their own use and others for inclusion in housing developments, or for general sale.

Adequate fallout shelter can be constructed at from $25 to $150 per person. The lowest figure $25, applies to "do-it-yourself" family shelters in basements.

Where separate independent structures are required for fallout shelter, the cost may run $150 per person or more. The cost for most shelters will fall between these two extremes. Cost tends to be lower when the shelter can be incorporated in new buildings at the time of design.

What standards are required?

In planning for fallout protection, it is necessary to consider the degree of fallout contamination which may occur, the radiation dose which can be accepted for humans, and the type of shelter required.

OCDM has undertaken to review and accept plans for fallout shelters which may vary from those included in our official publications. We encourage contractors and builders to specify the degree of protection afforded.

This chart indicates the intensity of fallout contamination which might spread across Iowa after a 10-megaton surface nuclear detonation on Offutt Air Force Base near Omaha. The assumed weapon design is fifty percent fission--fifty percent fusion; and the spread of fallout is based upon average summer weather conditions.

When a 10-megaton nuclear weapon is detonated at or near the surface of the earth, an area of blast and fire devastation spreads out to about ten miles from ground zero during the first minute after detonation. This is shown by the cross-hatched area on the chart and represents almost 450 square miles. During the subsequent 18 hours over 5,000 square miles would be seriously contaminated by fallout as shown by the colored shading. Six hours after the detonation, fallout would have spread 130 miles to Des Moines, and after 18 hours, about 300 miles to the Davenport-Rock Island area.

Without fallout protection, virtually all people in the red and blue shaded areas would die during the first three or four weeks, and most of those people in the yellow and inner green shaded areas would suffer serious radiation sickness which might incapacitate them for periods of weeks to months. For example, the cumulative outside radiation dose during the first two weeks at Atlantic might be as high as 20,000 R. At Des Moines, it would be about 2,000 R; at Grinnell, 400 R; at Iowa City, 200 R; and at Davenport-Rock Island, 100 R.

Medical advice to *OCDM* is that an individual can continue to work efficiently if the total radiation dose, spread over a few days, does not exceed 200 R. A dose of more than 200 R within the period of a few days, probably will cause radiation sickness.

Time is a factor in measuring the effects of a radiation dose. The body repairs some of the radiation damage. Thus, an individual can absorb a given dose over a period of weeks without being incapacitated, although the same dose absorbed in a few days could cause serious illness.

In wartime, an individual required to risk radiation hazards might be able to take as much as 900 R in a year without being incapacitated. It would be necessary, of course, to make certain that the radiation dose was spread out more or less evenly over the full 12 months.

To keep radiation exposure below 200 R, the home itself would provide sufficient protection in much of this fallout area. In this illustration, fallout shielding afforded by the

first floor of an average home would be sufficient 200 miles from the point of explosion. This degree of shelter, as indicated on the right side of the drawing, will reduce the radiation exposure to one-half of that which exists in open area around the home. At Davenport-Rock Island, the cumulative dose to people who remained on the first floor of their homes for the first two weeks would be about 50 Roentgens. In Iowa City, the dose would be 100 R on the first floor, during the first two weeks.

At about 130 to 200 miles from ground zero in this example, the corner of a home basement should provide sufficient protection to prevent radiation sickness. As indicated in the center of the drawing, this degree of shelter will reduce the radiation exposure up to one-twentieth. If the people at Grinnell remained in the corners of their basements during the two-week interval, their radiation exposure would total approximately 20 R. In Des Moines, the two-week exposure under these conditions would be 100 R.

However, better fallout protection is required out to approximately 130 miles from ground zero. In this zone, the visual shows our "do-it-yourself" basement concrete block shelter which costs between $150 and $200. This shelter, which can reduce radiation exposure to about 1/200th, would provide adequate fallout protection in most of the nation. At Atlantic, people who remained in basement concrete block shelters would be exposed to a radiation dose of about 100 R during the first two weeks. It should be noted that in all of these cases, the cumulative dose has been kept to, or below, 200 R.

In the event of a nuclear war, there will be many surface detonations in the United States. The fallout patterns will overlap one another and be far more complicated than this simplified pattern. This overlap of fallout will cause greater radiation intensities than indicated on this visual. There will be areas where homes and home basements will provide adequate fallout protection. However, there is no way of predicting where these areas will be. Consequently, we cannot advise that the first floor or basement of a home in any specific area will provide adequate protection. Rather, all families must be encouraged to provide themselves with the fallout protection recommended in our family fallout shelter manual. With this standard, all of our people who survive the initial blast and thermal effects could survive the effects of fallout in a nuclear war.

The success of a program of fallout protection would be dependent upon other emergency services and, in particular, upon the effectiveness of radiological monitoring and upon adequate communications.

OCDM's National Warning System can transmit warnings to over 300 key points in every State within 90 seconds. From these points, other networks and systems spread the public warnings and action signals so that almost all areas are alerted in minutes. Our warning officers are on duty twenty-four hours every day at North American Air Defense Headquarters, side by side with the military warning officers, and with simultaneous access to warning information.

We are strengthening this system, adding other points to the primary warning system. Our ultimate objective is to have such an effective warning system that all people will receive notice of an attack simultaneously.

OCDM provides funds for all equipment necessary to establish the warning points in this National Warning System *(NAWAS)*. These points are manned by State and local personnel. To encourage the extension of direct warning capability, *OCDM* also provides funds to the States and cities on a 50-50 basis for *NAWAS* extensions. New York State now has one *NAWAS* extension in each county.

Sirens and other warning devices to reach the public are paid for with fifty percent Federal funds and fifty percent State and local funds. 129 principal cities in the United

States now have adequate siren coverage, but it must be remembered that sirens primarily warn people who are out of doors.

Considerable research has been conducted to develop an efficient and economical indoor warning device. A promising development is the National Emergency Alarm Repeater System *(NEAR)* which is in the final test stages. This system utilizes power lines to provide a means of direct warning to individual homes and other buildings. Today, warning time of 2 to 3 hours is regarded as probable. With the development of missiles, tactical warning may be reduced to 15 to 30 minutes. This reduction in warning time requires us to develop the maximum of direct warning capability and to keep the need for relay of information to a minimum.

Standard *AM* radio, controlled under *CONELRAD*, would be used as an adjunct to the warning system both before and after an attack. It will be particularly valuable in warning the population of *expected* fallout, and for advising people when they can leave their shelters.

We have a command communications network which is ready for operational call-up at any time. It connects our headquarters with the Regional Offices and the States. This system shortly will be on a full-time basis, and during the next year will have a radio backup. Within the States great reliance is placed on police and other public radio and land lines networks. Many State systems have been improved with fifty percent matching funds, made available under the *OCDM* Financial Assistance Program. Communications with the public will be primarily by radio.

A national radiological monitoring capability is being developed to warn the public rapidly of danger from fallout and to furnish post-attack radiation information upon which Federal, State and local governments can base protective and recovery actions.

A network of approximately 150 thousand fixed monitoring stations is being established across the country. Approximately six thousand of these stations will be at Federal locations, manned by Federal employees. The remaining 144 thousand will be at State, county, and local facilities. Today, approximately 15 thousand of these stations are in operation. The total network of 150 thousand stations is scheduled for completion by the end of calendar year 1963. The Office of Civil and Defense Mobilization provides the monitoring instruments required at these stations. They are operated by regular Government employees.

OCDM and *AEC* have been striving to perfect a simple, effective, and inexpensive home monitoring device to detect and measure fallout radiation. Such instruments can be used to select the safest areas in home or shelter, to estimate how long a family should expect to remain in shelter, and when it is safe to leave.

OCDM announced last fall a significant advance toward reasonably priced radiation instruments for the citizen. One company has offered a package of two instruments and a charger at a retail price of $20, which can be used to measure (1) dose rates over a range from less than 1 roentgen per hour to more than 100 roentgens per hour, and (2) radiation doses up to 600 roentgens. *OCDM* is buying an initial quantity of 100 sets of these instruments, furnishing each State one set. Another company has indicated that it plans to offer instruments in the same price range at a later date.

OCDM research to improve instruments and reduce costs is continuing. Once a suitable instrument is developed, we plan to study various methods of packaging, distributing, and marketing. Any device recommended for public purchase must be reliable, accurate, and simple. Current research is expected to be completed this summer. At that time, one or more of the instruments under consideration may be officially endorsed.

We continue to utilize results of *AEC* research in the instrument field. Recent prototype developments under AEC sponsorship include (1) a geiger counter combined with a radio, and (2) another device in which warning of radiation is given by a siren-like noise produced through use of a cadmium sulfide crystal detector in a radio. It is hoped that added cost in the first would be no more than $20 and in the second about $10.

Citizens instruments will not replace the standard radiological survey meters designated for operational use.

Neither will the widespread use of such an instrument reduce the need for trained *CD* monitors. Instead they supplement national radiological defense.

The National Policy on Evacuation is one which is constantly misunderstood or misrepresented. The National Plan outlines the policy briefly and specifically. It states:

"Governments and the public will take such action on receipt of warning as is prescribed by the Government involved."

(1) "Evacuation or Dispersal—*target cities* and *other areas near assumed targets* will, if time and conditions permit, execute plans for evacuation or dispersal to prepared reception areas.

(2) "Shelter—if time and conditions do not permit evacuation, full advantage will be taken of existing shelter, and fallout protection will be improvised.

(3) "The action to be taken is a local decision."

State and local governments under their federally financed survival plans have established evacuation plans based upon the time and conditions which would permit evacuation of a given area. All States, 240 target areas and 2,200 counties have developed survival plans.

We emphasize that evacuation is one principal tactic. We must be ready to execute movement plans either before or after an attack—if conditions dictate such action. This policy of evacuation is tied closely to a policy of shelter but neither tactic should be developed to the exclusion of the other.

This is the same tactic which is so basic to military operations under conditions of nuclear war. If people are within the "A" ring of a nuclear explosion, their chances are slim. These chances are substantially increased if they are able to move even relatively short distances after tactical warning. We would be derelict in our duty if we were not prepared to execute such moves when warning time permits.

We are placing great emphasis on the construction of family fallout shelter. Evacuation plans should emphasize movement home to these shelters wherever possible. Sometimes it could be desirable to evacuate an area of intense radiation after an attack.

All of these programs—warning, communications, radiological monitoring and movement—together with other measures for civil defense and defense mobilization—have the purpose, as stated in the preface to the National Plan for Civil Defense and Defense Mobilization, to "deter aggression, and in the event of aggression to enable the nation to survive, recover and win." Full-scale recovery efforts cannot begin until the fallout radioactivity rate drops to levels safe enough to permit emergency crews to spend limited times in the open.

In areas of heavy fallout that would be about two weeks—it would be necessary for everyone to remain sheltered that long. That means every individual family would have to subsist on its own with what it had on hand at the time of attack.

Government action during this period would be limited largely to "Disaster Services." These include fire-fighting, rescue, monitoring radiation, and limited emergency feeding.

Later, as crews were able to spend more time in the open, the city, State, and Federal Governments would be able to help in recovery efforts, emergency feeding and other essential services.

We cannot say too bluntly that in the first two weeks after attack every individual family and every city and State government is likely to be on its own.

Our economic system depends upon a constant flow of goods and services across the nation. A city or even a State isolated by a nuclear attack would be able to meet the basic needs of its people for but a limited time.

As these communities cannot depend upon help from outside, the National Plan calls for States and cities to make preparations to survive without help for at least four weeks after attack. After that period, States could call upon the Federal Government.

OCDM's overall responsibility for resources management would be carried out by using the capabilities of the entire Federal Government, according to plan. The Department of Agriculture has been given responsibility for food, Interior for fuel and energy, Labor for manpower.

These and other resource areas are covered in the National Plan and its Annexes, which have been developed with the cooperation of State and local directors as well as the other Federal agencies.

Such problems of recovery are in many ways more complex than those of more immediate survival. Both require much advance preparation.

Announced on May 7, 1958, the National Shelter Policy has met with reasonable public acceptance. The extent of public interest, as evidenced by letters and inquiries regarding plans, is encouraging, despite delay in obtaining appropriations to speed the action elements of the policy.

The Federal role has included the following action elements:

1. *Education*, with emphasis on facts about fallout and steps which can be taken to to minimize its effects;
2. *Survey of existing shelter*, on a sampling basis, to demonstrate the value of existing structures in providing fallout protection;
3. *Research*, to show how fallout shelters can be incorporated in existing, as well as new buildings;
4. *Prototype design and construction*—a program of both research and demonstration;
5. *Leadership and example*, by incorporating fallout shelters in appropriate new buildings; and
6. *Incorporation of shelters in existing Federal buildings (not yet funded).*

I have touched on these points but want to reiterate the important measures taken in the field of Federal leadership. Here, we must eliminate every barrier and do everything possible, by example, to give evidence that the Government realizes the seriousness of the problem. These are recent measures involving Federal loan or grants-in-aid programs:

1. The 1961 budget will include funds for incorporation of fallout shelters in all new civilian Federal structures determined to be suitable. $11 1/2 million has been requested.

2. The Federal Housing Administration and the Veterans Administration have announced that fallout shelters will be eligible items in determining valuation for loans or loan insurance. In addition, *FHA*, home-improvement loans are available to finance building of fallout shelter in existing structures.

3. The Housing and Home Finance Agency and the Community Facilities Administration have announced that fallout shelters may be included in projects qualifying for Federal loans and advances under its College Housing Program, its Public Facilities Loan Program, and its Project Planning Program.

4. The Department of Health, Education and Welfare and the Public Health Service have announced that grants for hospital construction under the Hill-Burton Act will be eligible for incorporation of fallout shelters.

5. The *HHFA* and the Urban Renewal Administration will make "Master Planning" grants to local authorities available for planning the incorporation of fallout shelters in urban redevelopment projects. In addition, local authorities may include fallout shelters in site development improvements and receive full credit toward the local share of the project.

6. The Public Housing Administration is studying the possibility of ruling that fallout shelters may be included in new low-rent public housing projects upon application of local authorities.

Survival, recovery and victory—these are our goals if war comes.

I have made here three major points. They are:

First, fallout protection is feasible. We know the designs, the materials and the cost.

Second, the standards of fallout protection are reasonable.

And Third, fallout shelter has a sensible and direct relationship to overall radiological defense, evacuation and recovery.

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Need for State and Local Initiative in Stimulating Individual Action

NELSON A. ROCKEFELLER, *Governor, State of New York*

Under the 1958 amendments to the national civil defense legislation, the Congress expressly declared, as its policy and intent, that "a system of civil defense for the protection of life and property in the United States from attack" be provided and that "the responsibility for civil defense shall be vested jointly in the Federal Government and the several states and their political subdivisions."

The Congress plainly believed that the nature and magnitude of the problems of protecting our civilian population from the consequences of thermonuclear attack would call not only for the best, but for the fullest, cooperative effort by all levels of government, federal, state and local. This approach seems exceedingly wise.

One of the enduring merits of our federal system is its flexibility. It does not require that strict jurisdictional lines be drawn between the state, local or federal responsibilities other than those which the Constitution has expressly assigned. A multitude of cooperative arrangements is possible under which the central thrust for action may come either from local, or state, or federal agencies as the time, the occasion, and the need may warrant. Arrangements under which federal, state and local government officials cooperate with a commonly shared and well-defined purpose can achieve solutions that might well be beyond the capacity of a single level of government, acting independently of the others.

So, in the case of fallout protection, a cooperative approach, involving all levels of government, should permit us to achieve that delicate and complex balance between the desirable goals of central strength and federal leadership, on the one hand, and local freedom of action and initiative, on the other. Technical, jurisdictional or legalistic arguments as to where the "paramount" responsibility may lie do not contribute to the constructive solution of what is an urgent problem for all of us.

This afternoon the federal officials will suggest to us the extent of the effort that can and will be made by the federal government in the foreseeable future to achieve fallout protection and to support the states in their effort to provide such protection for their people. Regardless, however, of the level of effort of the federal government, regardless of the level of funds which the federal government may make available, regardless of the inducements and incentives which the federal government may offer looking to the development of fallout protection, there will remain, as an essential of any successful program for providing fallout protection for our citizens, the need for state initiative.

Fallout threatens the health and the safety of every individual, and in a highly personal way, even within the security of his own home. The health and safety of our citizens and the security of their homes is a classic area of state and local concern and local responsibility. This concern is no less when the threat arises from fallout than it is when the threat lies in fires, pollution of water, air pollution, unsafe or hazardous structures, noxious odors, crimes or disorder.

Fallout protection falls well within the familiar range of operation of local codes and regulations, and of the local inspection and enforcement which enable us to live orderly

and secure lives. Building regulations, fire codes, police protection, safe and healthy working conditions, the movement of school children to and from their homes, adequate housing, the maintenance of sanitation facilities, and the provision of food and medicines to those in distress--these are all subjects of community activity which are of a local and personal nature. Their volume and magnitude require local handling.

Since such matters as these are already matters of extensive state and local regulation, inspection and enforcement, any adaptations of these regulatory systems as may be needed to meet the new hazards of radioactive fallout must, if we are to avoid multiplicity of regulation and administrative confusion, necessarily be left to state and local initiative and not to federal action.

The National Plan, promulgated by the President, makes dramatically clear the exceedingly personal and local nature of the fallout protection problem. The National Plan makes plain its command to each and every individual citizen with these words:

> "Each person and family must be prepared to meet individual survival requirements for two weeks following an attack without dependence on outside assistance." (Underscoring supplied)

This obligation, which rests on all of us as individuals, to prepare to survive without assistance for the first two weeks after attack is followed, under the National Plan, with a state and local government responsibility to assist, during the succeeding two-week period, in meeting the survival needs of their citizens. Not until the fifth week following an attack is it anticipated that the federal government would be able to render assistance either to the states or to local communities or to the individuals who may desperately be in need of it.

For the first four weeks after a nuclear attack, therefore, under the National Plan within which our nation is operating, survival is a personal, a local, and a state responsibility. As matters now stand, our citizens and our state and local communities are not prepared or able to meet these vital responsibilities, nor will they be able to meet them adequately without a full measure of state initiative. This is a matter of genuine personal and official concern to every Governor.

State initiative, accordingly (supported by the fullest federal participation that is attainable), is required by the nature of the fallout hazard, by the measures which are required to protect against it, and by the steps which are needed to survive in its presence.

There is also another compelling reason for state initiative. Only if the people in all of our fifty states fully understand the nature of the fallout hazard and how they may combat it successfully will a fallout protection program be truly effective. This calls for a tremendous educational job. And, no matter how imaginatively or resourcefully we use the media of communication, the best educational results will be achieved only if individual citizens participate, on the local level, in the concrete, understandable, day-by-day steps to work out fallout protection for themselves, their families, and their neighbors.

In the last analysis, only by a local, community-wide effort, which is credible to its participants, will the public truly be alerted to the danger and truly informed on how to meet it should the awful eventuality of nuclear warfare ever come to our country.

Much has been said about the apathy of the American public toward civil defense measures. I am persuaded that we are witnessing a phenomenon which is not so much apathy as it is frustration and fear in the face of the unknown. If the American people understand the essentiality of fallout protection and the feasibility of achieving it and then participate directly and locally in the affirmative steps to achieve it, the so-called

apathy will be replaced by vigorous action and a healthy confidence in a peaceful future. Then I think we can have some measure of assurance that, no matter how terrifyingly, or realistically, nuclear blackmail may be threatened by those who might be tempted to impose upon our reasonableness or our love of peace, we, as a nation, could maintain our liberty and our life.

Federal Action in Support of State and Local Initiative

MEDICAL SUPPLIES AND PERSONNEL

ARTHUR S. FLEMMING, *Secretary of Health, Education, and Welfare*

My Department is in process of receiving an OCDM delegation which will give us the responsibility for developing a Federal program of support to State and local governments in their health and welfare emergency preparedness programs. The skilled management of health resources will be a major element in our Federal approach.

Health resources include manpower, supplies and equipment, and facilities. The orientation of these resources to emergency needs, their careful direction for maximum effectiveness, and their provident use in thermonuclear attack, are critical to the health of our civilian population, and this will be a matter of paramount importance to national survival.

The biomedical situations, which will govern health resource utilization in the post-attack period, can be readily visualized in terms of the effects of a possible nuclear attack upon the United States. Casualties due to the direct and indirect effect of the bombs will number in the millions, and during the first days after the attack, fallout radiation will have sufficient intensity over much of the country to pin down the survivors in whatever shelter they may have been able to obtain. During this period, organized first aid and rescue efforts will be impeded by fallout. Medical care will be limited to self help and neighbor help. Those who survive this immediate post-attack period will then be faced with continuing problems of markedly inadequate medical supplies and equipment, inadequate numbers of skilled workers, and grossly inadequate health facilities.

In addition, such problems as inadequate amounts of food and water, shortages of clothing, heat and housing, and the breakdown of normal public health controls of insects and rodents, wastes disposal, and communicable diseases would increase further the disparity between the health resources available and the amount required to meet the normal health needs of the survivors.

It must be realized immediately that even the most intensive health resource program cannot reduce to any significant degree the effect of exposure to radioactive fallout. The old saying that an ounce of prevention is worth a pound of cure is nowhere more true than when applied to nuclear warfare. In fact, an ounce of prevention here is worth a megaton of cure.

Just as no safety engineer should hope to solve his problems by improved methods of surgery and treatment for those injured because of shortcomings in safety measures, so also in civil defense we should not expect much from improved methods of treating cases of radiation sickness. It would be exceedingly optimistic to hope for any medical treatment which would save the lives of those exposed within a few days to 1,000 roentgens, or to hope for a treatment which would reduce the biological effects from a given amount of radiation by a factor of two. In contrast, the simplest kind of improvised fallout shelter can reduce exposure many fold.

Treatment ***in addition*** to shelter can be of considerable value, but can never be a substitute for shelter.

Although the death, destruction, and chaos which would result from a thermonuclear attack may appear medically overwhelming, and although there are seemingly insurmountable problems presented by the possible magnitudes of such attack, we have considerable medical knowledge and material assets to assist us in our preparedness planning and emergency mobilization operations. Some of these factors on the positive side of the ledger may be enumerated as follows:

First. It is clear at the start that while the catastrophe is unprecedented in ***magnitude***, most of the problems it presents are familiar on a ***small*** scale. The most immediate casualties will be caused by blast, flying objects, and burns—all well-known types of injury. Even the effects of radiation and contaminating radioactivity which add a relatively new hazard to warfare are not new and unfamiliar to medicine. X-ray burns and radiation sickness were recognized shortly after the discovery of X-rays themselves. The experience of watch dial painters in the 20's showed the hazards of ingestion of radioactive materials. In addition, there is abundant data from actual warfare experiences in Japan and in the many clinics of this country where radioactive materials have been used in medical care.

It is only in the region of long range chronic effects that there is a lack of adequate medical knowledge. We are not sure whether a man exposed to a certain radiation dosage has twice or ten times the normal chance of developing leukemia; how much his life will be shortened; or, whether his children have twice or ten times the chance of a lethal mutation. But our inadequate knowledge in this field does not directly relate to the immediacies of the post-attack period.

Second. We have considerable knowledge regarding the physical aspects of radioactive fallout; for example, the probable distribution, intensity, and duration of radioactive fallout under attack conditions, the effectiveness of shelters as protection from fallout, and the effectiveness of relatively simple measures in gross external decontamination of fallout victims.

Third. Considerable knowledge in mass casualty care has been developed by the military. This knowledge is being adapted to civilian situations, and preparedness planning at the National, State, and local levels has been significantly advanced in the last few years.

Similarly, emergency preparedness measures in public health, welfare, and rehabilitation are under intensive study and the knowledge developed will be of appreciable assistance at the State and local levels.

The medical, nursing, and other health professional organizations are actively collaborating with the government in these programs.

Fourth. The Federal Government has procured $200 million worth of civil defense medical supplies and paid half the cost of another $30 million worth procured by the States. The Federal supplies consist of about 2,000 civil defense emergency hospitals, 1,300 of which are already prepositioned in communities throughout the country according to State survival plans, and of about $168,000,000 worth of drugs and supplies stored in 43 warehouses dispersed over the country. An additional 70 emergency hospitals have been loaned to the States for training purposes, and are being actively used to familiarize the doctors, nurses, and other health personnel of our communities with their contents and operation.

Fifth. Extensive additional work is being done in the health resource field:

(a) Combined agency studies are being carried on in the manpower field under the leadership of OCDM. Health manpower management is receiving considerable atten-

tion, and it can be anticipated that effective measures will be developed which will insure the proper utilization, distribution, allocation, and training of this important resource.

(b) Health supplies, equipment, and facilities have received considerable study. A determination of the existing national inventory of certain essential survival items at all levels as well as the production capability for each, both pre-attack and post-attack, has been completed recently. This study has refined previous estimates of the serious disparity that will exist between requirements and availability of supplies for a considerable post-attack period.

To provide a reasonable measure of preparedness in the medical supply and facility area post-attack would require substantial increases in stockpiled survivor items, and a considerable number of additional 200-bed Civil Defense emergency hospitals.

In addition to buying and stockpiling supplies, we must devise more efficient methods of utilizing these supplies in terms of capability of use, and then prepositioning the supply units at the sites where they will be needed in post-attack period, and, finally devise better methods of rotation, storage, and protection to prevent their spoilage, deterioration, and loss.

Sixth. We are devoting intensive efforts to develop training programs and informational material which will assist the States and local communities in developing the skills and capabilities of the lay, semiprofessional, and professional personnel required to implement their emergency mobilization plans. National training programs in health mobilization will be presented in April, May, and June of this year. These programs will present as completely as possible the latest available knowledge on the protection and treatment of radioactive fallout victims as well as the best available methods of operating an emergency medical care program in the post-attack period.

And finally, we are developing, in conjunction with one group of States, a structure consisting of State assignees and community consultants, including reserve officers. These persons will stimulate the training necessary for communities to discharge their health and medical responsibilities, and serve as a potent resource to the State and community in the post-attack period.

As my Department conceives its overall role for developing a program of support for the emergency operations of State and local governments, we will carry out this role in two parallel and, we hope, mutually reinforcing patterns of activity. The first of these, of course, is the work which we are and will be carrying out under the OCDM delegation. The second is the development of a detailed plan and program of operation by which our entire Departmental resource can be brought to bear in both the pre- and post-attack periods. Our approach to the States and to the local governments will follow this same pattern of thought, since we believe that government, at all levels, cannot accomplish the maximum emergency effort of which it is capable unless every local community and State as well as all Federal agencies are able to focus their entire resources of manpower and supply at will on the occasion of need.

Federal Action in Support of State and Local Initiative

FOOD SUPPLIES

TRUE D. MORSE, *Under Secretary of Agriculture*

The U. S. Department of Agriculture (USDA) has important emergency responsibilities for food as a resource which must be carried out in close cooperation with other Federal agencies, State and local governments, farmers, the food industry generally, and the public.

In this statement particular attention is given to the immediate post-attack period since plans for this period are most difficult to develop.

Food Action in Immediate Post-Attack Period—Should Such Attack Occur

The individual family should be prepared to feed itself and remain in the family fallout shelter for the initial two-week period following attack. Even the best prepared families will need assistance after home stored foods have been used, and some families will need help before the two weeks have expired. Families and individuals will obtain assistance through remaining retail outlets as soon as it is safe to be out in the open. Local retail outlets will be aided by the rationing and mass feeding programs administered by local government.

It is emphasized that the USDA will rely heavily on the cooperation of farmers, food processors, and distributors and will utilize government controls only when necessary to supplement the efforts of the food industry.

Whenever it appears that food supplies in local retail channels (plus any wholesale stocks designated for local use) are about to run behind agreed upon requirements, steps will be taken by the local office of USDA to obtain additional food.

Even if communications with other offices are cut off in an emergency, the local office of USDA will have authority to take whatever action is needed to insure the best utilization of commercial supplies at wholesale, processor and farm levels, together with locally stored government stocks of the Commodity Credit Corporation.

If communications permit and if food supplies from these sources are inadequate, the USDA local office will request assistance from the USDA State office. Through the USDA State office assistance from the USDA at the national level may also be obtained if needed.

USDA will make every effort to provide adequate food to local governments. In carrying out its Federal food responsibilities, the USDA will not withhold or divert from a community food which it needs to meet approved dietary levels. A possible exception would be providing of food needed for the military. A primary aim of the Federal government is to see that all people in all areas are fed as adequately as emergency circumstances permit.

Even in the immediate post-attack period it is not enough to concentrate on the proper distribution of food supplies which exist at time of an attack. It is also important that es-

sential food production and processing be continued at the highest level possible or as needed to meet requirements.

There will be need to see that perishable foods are used first so as to conserve storable products and supplies for future use and for people in those areas where perishable products cannot be used due to fallout contamination.

In all this activity full cooperation and close working relationships will be maintained between Federal, State and local governments and between USDA, the Office of Civil and Defense Mobilization and other Federal agencies which have program responsibility for the supporting materials and services which are so vital to the food program.

USDA will look to State and local governments for assistance in obtaining such essential supporting items as transportation, fuels, energy, and manpower in the immediate post-attack period whenever help cannot be obtained through Federal resource channels.

The plan just outlined is described more fully in the "National Food Plan" which is Annex 31 to the "National Plan for Civil Defense and Defense Mobilization." This plan will serve as a framework within which the following preparedness steps must be taken:

Preparedness Measures

A broad educational program must be carried forward at regional, State and local levels designed to help insure a full understanding of the relative responsibilities of the Federal, State and local governments for food as they will apply in particular areas.

State and local governments should develop plans for a retail food inventory and for the control of retail food distribution in the immediate post-attack period, so as to prevent waste and insure the best use of available food supplies. State and local governments should encourage the maintaining of home and retail stocks and develop plans for mass feeding which will be needed at reception centers and elsewhere.

Plans of USDA take into account the substantial built-in readiness which the Department has as a result of its regular program responsibilities. USDA will proceed to clarify its emergency field organization so that full utilization can be made of the extensive existing staff of the Department at State, county and community levels. Adequate authority will be delegated to appropriate officials of USDA at each of these levels in the pre-emergency period.

Ability to assess the effects of attack on food supplies and food facilities is being developed. To assist in this and related work a card directory of all major food processing and storage facilities is being assembled. It should also be noted that USDA is carrying out an extensive training program for members of the staff who will monitor radiation in event of emergency.

The food program is a direct beneficiary of plans which USDA is preparing for defense against biological and chemical warfare in relation to animals and crops, and defense against fire in rural areas.

Total Food Supplies Will Be Adequate

Studies made by the USDA suggest that the overall supply of food will be adequate immediately following any attack on the United States. The main problem will be to transport and distribute food to places of need and assure equitable distribution to all people.

This is a principal reason why large food stockpiles have not been advocated.

It is recognized, however, that families should have their two weeks supply, that public shelters should be stocked with food and that some buildup of food stocks not produced

in sufficient quantity in the United States may be needed. It is also recognized that there are special food problems for some areas such as Hawaii and Alaska which are particularly vulnerable.

The Commodity Credit Corporation has substantial stocks of agricultural commodities but most of these stocks are not in the form normally used directly for food. On a temporary survival basis, however, these can be used during any immediate post-attack period by such preparation as survivors can give.

Commodity Credit Corporation has a policy to include defense among the criteria used in the location of CCC owned stocks and storage facilities, but inventories of food commodities owned by CCC other than wheat and cereals are relatively small.

Summary and Reference to Longer Range Problems

In summary, it is clear that in the event of an attack on the United States, USDA, State and local governments, farmers, food processors and distributors and the public all have important food responsibilities in the immediate post-attack period.

It will be necessary for all to cooperate fully if the job of feeding the people is to be accomplished successfully. This cooperative action will be possible only if adequate planning is done in the pre-emergency period and if these plans are fully understood by all concerned before any emergency occurs.

Readiness to carry out the emergency food program is simplified somewhat by the fact that the country is now well stocked with supplies of many commodities and by the fact that the USDA has a far reaching field staff of personnel already administering programs which can be used in an emergency with little adaptation.

Although major emphasis has been placed on food problems in the immediate post-attack period, the problems do not stop there. Production, processing and distribution of food in the longer range period will necessitate the continued cooperation and best efforts of the Federal, State and local governments; the food industry; and the public. Plans are also being developed to meet these problems.

Federal Action in Support of State and Local Initiative

HOME SHELTER FINANCING

NORMAN P. MASON, *U. S. Housing Administrator*

The National Shelter Policy lays stress on the responsibilities of individuals and groups in the provision of fallout protection. The policy also properly puts great emphasis on the need for Government leadership, example and technical assistance.

Through its various programs of assistance to housing and community development and redevelopment, the Housing Agency has taken a number of important steps to support the National Shelter Policy. Further actions designed to stimulate and assist the provision of fallout shelters are planned.

All of these actions have been developed with the full and helpful collaboration of Governor Hoegh and his staff. In the field of housing we are giving real encouragement to shelter construction. We are exerting our leadership with the building industry and with the home buying public to see that the National Shelter Policy is a practical reality.

Before I describe the specific steps we have taken in HHFA, I should perhaps identify certain characteristics of the Federal Government's housing programs.

First. In all of HHFA's programs, Federal support takes the form of financial assistance, through partial subsidies, loans, or loan insurance.

Second. HHFA builds no houses. Construction (whether residential or nonresidential) assisted by HHFA is initiated, owned and operated either by private individuals and groups or by local public bodies.

Third. When the financial assistance goes to public bodies, HHFA generally deals directly with these local agencies of government.

Here is a brief summary of the steps we are taking in HHFA to stimulate and assist in the construction of fallout shelters.

1. *Shelters in New Homes Financed with FHA Assistance.* FHA is putting its leverage behind the shelter policy and is actively cooperating with building contractors and private individuals to set an example by incorporating shelters in new housing developments, new subdivisions and model homes.

This program is based on our belief that popular demand for home shelters will make it appropriate to reflect their cost in property values for mortgage insurance purposes. This will make FHA financing generally available for shelter construction in new homes. All FHA directors throughout the country have been briefed on the program.

In addition, FHA is taking a number of other steps designed to mobilize its resources in support of shelter construction in private homes. These include special policy statements and field bulletins devoted to the encouragement of home shelter construction, conferences designed to solicit the support and participation of the homebuilding industry, and the promulgation of technical instructions on shelter construction to FHA field offices and to the building industry.

2. *Shelters in Existing Housing.* The construction of fallout shelters in existing housing is being encouraged by FHA through its Home Improvement Program which involves insurance of installment loans for home modernization and repair. The FHA Commissioner has issued a bulletin to all qualified home improvement lenders calling their attention to the fact that shelters are eligible for financing under the Home Improvement Program. The bulletin requests these lending institutions to encourage homeowners to consult with the local Civil Defense Office, and to procure literature showing recommended construction details as well as standards for equipping shelters.

3. *Shelters in Multi-Family Dwellings Financed with FHA Assistance.* The criteria and specifications for shelters in multi-family dwellings are being developed by the Office of Civil and Defense Mobilization. When these technical guides are available, FHA will move ahead to promote and assist in the construction of fallout shelters in multi-family structures financed under its programs of mortgage insurance.

4. *Public Shelters in Redevelopment Assisted under the Urban Renewal Program.* The Federal Urban Renewal Program has been adapted to stimulate and assist the construction of public shelters on slum land to be cleared and redeveloped under that program. The Urban Renewal Commissioner has issued instructions to his regional representatives to cooperate fully in the Shelter Program by giving guidance and support to local public agencies to include public shelters in redevelopment plans. A ruling has been made that public fallout shelters proposed by local public agencies may be accepted as part of the local share of project costs, provided the structures meet standards acceptable to the Office of Civil and Defense Mobilization.

5. *Shelters in College Dormitories Assisted under the College Housing Program.* HHFA's Community Facilities Administration makes loans to colleges and universities for the construction of dormitories and student and faculty housing. The Community Facilities Commissioner has ruled that the additional cost of providing shelters in these structures can be covered under the Federal loan. In addition, the Community Facilities Administration provides encouragement and technical assistance to institutions of higher learning to provide shelters in their dormitories and other construction assisted under the College Housing Program.

6. *Shelters in Local Public Works Financed under the Public Facilities Loan Program.* HHFA's Community Facilities Administration makes loans to local public bodies for the construction of public works. At present, loans are limited to small cities and preference is given to loans covering water and sewer facilities. Where the proposed project requires the construction of a building such as a pump house or a treatment plant, the cost of a shelter for the operating personnel of the system may be included in the loan. As in the College Housing Program, prospective loan applicants are told of the eligibility of shelters and are provided with technical assistance.

7. *Inclusion of Shelters in Local Public Works Plans.* HHFA's Community Facilities Administration provides interest free advances to public bodies to plan specific public works projects. The Community Facilities Commissioner has ruled that public works projects which include fallout shelters are eligible for Federal planning advances. The Commissioner has further ruled that a public shelter itself constitutes an eligible project provided the applicant has authority for this type of construction. Thus, through this program, a community may obtain advances for the sole purpose of planning fallout shelters.

8. *Shelters in Public Housing Projects.* The Public Housing Administration assists local housing authorities in the construction of low-rent public housing. Federal assistance is of two kinds: (a) the temporary financing of development costs; (b) the payment of annual contributions to the local housing authority over a period of years in an amount not to exceed the interest and amortization on bonds required to finance project construc-

tion. The Public Housing Commissioner encourages and will assist local housing authorities to include fallout shelters in newly constructed public housing to the extent that such construction does not lead to an increase of the Federal subsidy. This program will begin as soon as the OCDM has completed technical criteria and standards for fallout shelters in multi-family construction.

Federal Action in Support of State and Local Initiative

EDUCATION AND INFORMATION

LEO A. HOEGH, *Director of OCDM*

Governments, at all levels, share the task of educating the nation in fallout protection. They must impart knowledge about the effects of modern weapons and what people can do to protect themselves. They must explain, teach, and train.

OCDM is providing leadership in educating and training civil defense operational forces. It is creating a growing awareness of nuclear age realities in the American public.

OCDM conducts a formal training program including courses in radiological defense through the staff college at Battle Creek, Michigan, and at instructor training centers at Manhattan Beach, New York, and Alameda, California, and Battle Creek.

Courses for Federal officials are taught in our regions and orientation courses are conducted in the States by a traveling team of OCDM instructors. This course is then, in turn, taught by State officials under an initial contract with OCDM.

The training centers are used primarily to teach instructors in emergency management, staff and technical specialities training with special emphasis on the RADEF program. The RADEF school conducts courses for instructors, radiological defense officers, and for officials who must be familiar with the RADEF problem.

I am heartened by the increasing activity of the educational community. With the assistance of the Federal Office of Education and the State educational departments, OCDM is distributing kits of radiological instruments and instruction material to half of the nation's thirty thousand high schools. Nearly one million students learned nuclear age facts in these high school science classes last year.

We are now adding about four hundred colleges and universities to the project. Six of them give academic credit for the course.

Because the detection instruments aroused teacher interest, many took further training in our radiological defense schools and became instructors for State and local operational programs. Other results—nuclear age facts are being added to school curricula and textbooks.

National educational associations are now issuing informative booklets advising their members how to make civil defense instruction available in the schools.

The adult education system has begun programs in weapons effects, community and personal protection. We are financing special pilot projects in Minnesota, Florida, Kentucky and Texas with encouraging results. The Office of Education is managing the program for OCDM, contracting with State education departments to employ small traveling teams of professional instructors to teach local adult educators. The local teachers, in turn, instruct a series of 12-hour civil defense courses.

The first of eight traveling teams began training the local teachers four months ago. Today, almost 60 percent of the first year's goal of 1,500 local teachers is already train-

ing local citizens. Many of the students are local leaders. I believe we will surpass the pilot project goal of 80,000 people instructed in this way. Other States are being added this year.

A text book, the first extensive civil defense study book, will be issued in 1960.

Another OCDM project adding to the essential knowledge of the teaching profession is nearing completion at George Peabody College in Nashville, Tennessee. A special Peabody staff has compiled a manual of material and methods for colleges to incorporate civil defense and mobilization concepts into teacher training curricula. These materials will be published this year and issued to appropriate colleges for their guidance.

As soon as possible, I want every teacher coming out of college, trained to teach civil defense.

To speed school building protection programs, OCDM has under contract a motion picture for schools supervisory personnel. It will advise administrators how to establish a school civil defense program.

All of you must be aware of the increasing attention mass media is giving our work. Two radio networks provide public service time for weekly civil defense shows. Another 15-minute transcribed radio showing is appearing on 2,100 stations each week—at their own request. Radio also is carrying, each week, thousands of spot announcements provided by our office.

With television time so expensive, extended civil defense programs are rare. Our 15 and 30-minute motion pictures have received generous televising, but we concentrate on animated spots, and messages by television and motion picture stars. These television kits, issued twice a year, include one-minute, thirty-second and twenty-second films on family protection.

Some of our special radio and television features attract widespread attention. "The Day Called X", produced for us by CBS, dramatically outlines an evacuation of Portland, Oregon, and effectively portrays the continuity of government program. This film has been seen by more than 20,000,000 people.

Our motion picture staff produces civil defense films. Thirty-three are current with three produced last year and three more under contract now. The films are used on television, in class rooms and for public meetings.

Civil defense activities are offered immediately to the television-news pool in New York City for television use, and newsreels are distributed to theaters.

We also issue special materials for such events as Operation Alert, Civil Defense Day, Farm Week and Armed Forces Day.

Since the shelter policy announcement, newspapers have devoted to the subject thousands of columns of space. Coverage increased sharply with the OCDM publication, "The Family Fallout Shelter," issued last spring. News feature and picture pages issued regularly to the nation's 11,000 weekly and daily newspapers get wide publication.

Magazines are finding wide reader interest in civil defense subjects. One national circulation magazine last year generated more than 40,000 written queries to our office for home shelter plans. Nearly 100 professional and technical magazines, national organization publications and association and industry periodicals carried shelter articles last year.

Booklets and pamphlets are vital to public education. OCDM issued nearly one hundred million in Fiscal Year 1959. Most were furnished on direct request of State and local

government officials. Most popular were *The Handbook for Emergencies, The Family Fallout Shelter, What You Should Know About the National Plan,* and *What You Should Know About Radioactive Fallout Protection.* Distribution of the simple wallet card outlining the five steps to personal protection totalled more than 40,000,000 in the last two years.

Our exhibit program is good. Nearly two million people saw our sixteen major exhibits last year, and our 1960 schedule with additional new exhibits assures a much greater audience.

More than one hundred national, civic, veteran, fraternal, and labor organizations are actively supporting the civil defense program. The American Legion is organizing light rescue teams at local posts, in addition to recommending home protection measures to its members. The Veterans of Foreign Wars and AMVETS are urging local posts to incorporate fallout shelter in their new buildings. Four State Junior Chambers have made shelter their number one project for 1960.

All national farm organizations are supporting our new rural program. The initial kits of educational materials have been distributed to every State. This program is centered around home protection shelter.

Another successful education program is aimed at America's homemakers. Practically all of the seventy national women's organizations are supporting it. In this program home shelters are stressed.

Another contributor to improved civil defense leadership is the Industrial College of the Armed Forces with its traveling teams teaching units on nonmilitary defense.

Our training department prepares training materials for State and local use, provides matching funds for local training and encourages the establishment of State and local training centers.

Many of the Federal departments and agencies, such as the Education Office of HEW, Extension Service of Agriculture, BDSA of Commerce, etc., are assisting us in informing the American people. Many States and local communities are doing a good job, but not all of them.

Our objective is to effectively inform every citizen of the threat, the effects of weapons and the actions required to protect themselves from these effects. We do not believe in scare tactics--we firmly believe that an informed citizenry will take action.

Appendix III.—Library of Congress Study of Stockpile Management

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LEGISLATIVE REFERENCE SERVICE

MANAGEMENT OF CURRENTLY OWNED GOVERNMENT STOCKS FOR NONMILITARY DEFENSE PURPOSES

By

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March 8, 1960

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MANAGEMENT OF CURRENTLY OWNED GOVERNMENT STOCKS FOR NONMILITARY DEFENSE PURPOSES

Introduction

The stockpiling programs and practices of the Federal Government have been the subject of a growing volume of discussion and controversy. Most of the stockpiling of minerals and other strategic materials is a direct result of the critical shortages experienced during World War II and the strong feeling that, in case of another major war, we should not be caught short the same way again. In the interim, conflicting pressures have arisen. On the one hand there has been the desire to reduce stockpiles, partly because of revised estimates as to the duration of any future conflict and material requirements for such a conflict, and partly because of the substantial costs of the stockpiling programs. On the other hand, there has been pressure from various producers of minerals and other strategic materials to continue to stockpile in order to maintain market prices.

To a considerable extent the agricultural stockpiling programs of the Commodity Credit Corporation have been subject to the same kind of arguments, with a lesser emphasis, of course, on strategic considerations.

Some of the criticism of the nation's stockpile program can be seen in the headings of articles appearing in the business press over the years. Barron's lead article for July 9, 1956 was

entitled, "Futile Hoard: The Stockpiling Program Has Outlived Its Usefulness." In a very similar vein, more than three years later, it repeated, in its September 21, 1959 issue: "Burdensome Hoard: the U. S. Should Start to Liquidate Its Stockpile." A leading article in the August 15, 1959 issue of the Magazine of Wall Street is headed "Wasting Our Dollars in Over-Stockpiling." Newsweek for Sept. 7, 1959 headlines, "Sticky Stockpiles." Business Week for May 23, 1959 deals with "The Threat of Stockpile Sales."

This Business Week article lists 46 commodities which, as of May 1959, had been stockpiled beyond the stockpile goals originally set. Several steps have been taken to curtail the stockpiling program. Already in 1958, the Office of Civilian and Defense Mobilization adopted a goal of a three-year supply of strategic items rather than a five-year supply as originally specified. In the spring of 1958 Franklin Floete, head of the General Services Administration, revealed that the Government was actively considering means of disposing of about $4 billion worth of commodities in its warehouses. Congress itself in September 1959, by H. Con. Res. 166, approved the disposal from the national strategic stockpile of specific quantities of rough cuttable gem-quality diamonds, cut and polished gem-quality diamonds, osmium, rhodium, ruthenium, and zircon concentrates, with a total market value of approximately $3.2 millions.

Despite the evident interest in the stockpile programs of the United States, one phase has received relatively little attention, namely the role of stock-piling programs in relation to nonmilitary defense purposes - specifically the significance of stock piles and stock piling programs for the recovery of the nation and its citizens in case of a nuclear attack. A few voices have been heard. For example, Klaus Knorr of the Center of International Studies, Princeton University, in a paper prepared for the Subcommittee of Foreign Trade Policy of the House Committee on Ways and Means, wrote in 1957 with reference to the condition of the United States after a thermonuclear attack:

"Most urgently needed will be the construction industry, transportation, repair, and other services, the industries producing building materials, etc. If advance preparations are to be made, they should - in addition to planning for efficient government and communications to facilitate recovery - chiefly take the form of stocks of goods ready for use, e.g., food, medical supplies and construction, transport, and repair equipment."[1/]

Probably the most important testimony on this subject to date was provided in the report, "Stockpiling for Defense in the Nuclear Age," prepared at the request of the Office of Defense Mobilization by its Special Stockpile Advisory Committee. The report,

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1/ U. S. Congress. House. Committee on Ways and Means. Foreign Trade Policy: Compendium of Papers on United States Foreign Trade Policy. Washington, 1957. p. 655.

issued on January 28, 1958, is commonly called the Pettibone report after its chairman, Holman D. Pettibone, chairman of the board, Chicago Title and Trust Company.

Its conclusions with respect to stockpiling needs in preparation for a post-nuclear attack situation are as follows:

"As nuclear attack is today a distinct possibility and threatens the very survival of the American people, this nation must attain and maintain a position of preparedness that is flexible, balanced and within its capabilities.

"Annual military expenditures now total about $40 billion. In addition, the Government maintains materials stockpiles and industrial facilities valued at many billions of dollars to support the defense effort. Yet for human survival and relief the Government has stockpiled items, principally medical, amounting to only about $200 million.

"The Committee recommends that in stockpiling, emphasis be shifted from raw materials to finished items and vital supplies for survival, relief and rehabilitation. Energetic steps should be taken to make coordinated studies in this area and to initiate appropriate programs."

Henry H. Fowler, a member of the committee, in a supplementary statement added:

"It is my strong conviction that the "energetic steps" referred to ... should include specifically early action by the Executive and

Legislative branches of the Federal Government to get the program under way by enactment of the initial appropriations which such program will require, and by the procurement of items covered by such initial appropriations....I feel that the urgency of the situation is sufficiently great, and the information already available is sufficiently extensive to warrant decisive action to initiate the program."

The principal function of this report is to outline the current status of the stockpile programs of the Federal government in the light of the needs of a post-attack situation.

Legislative authority for stockpile programs.

There are at present numerous laws on the statute books of the government under which the various stockpiling programs of the Federal Government are undertaken. The most significant ones are the following.

1. Strategic and Critical Materials Stock Piling Act of 1946 (Public Law 520, 79th Congress; as amended by Reorganization Plan No. 3, effective June 12, 1953). This act superseded the Strategic and Critical Materials Act of June 7, 1939. The preamble of the 1946 act reads:

"The natural resources of the United States in certain strategic and critical materials being deficient or insufficiently developed to supply the industrial, military, and naval needs of the country for common defense, it is the policy of the Congress and

the purpose and intent of this Act to provide for the acquisition and retention of stocks of these materials and to encourage the conservation and development of sources of these materials within the United States, and thereby decrease and prevent wherever possible a dangerous and costly dependence of the United States upon foreign nations for supplies of these materials in times of national emergency."

This act provides that the Secretary of the Army, the Secretary of the Navy, and the Secretary of the Interior acting jointly through the agency of the Army and Navy Munitions Board shall determine from time to time which materials are strategic and critical for national defense purposes and the quality and quantities of such materials which shall be stock-piled. The act provides, however, that except in time of war or national emergency "no material constituting a part of the stock piles may be disposed of without the express approval of the Congress except where the revised determination is by reason of obsolescence of that material for use in time of war. For the purposes of this paragraph a revised determination is by reason of obsolescence if such determination is on account of (1) deterioration, (2) development or discovery of a new or better material or materials, or (3) no further usefulness in time of war." This act provides for much the largest part of the strategic stockpiling currently undertaken, and the bulk of what is called the national stockpile.

2. Defense Production Act of 1950 (Public Law 774, 81st Congress).

This act, as amended, provides broad authority for the expansion of productive capacity, including the making of purchases or commitments to purchase metals, minerals, and other materials, and for the encouragement of exploration, development, and mining of critical and strategic minerals and metals. It also provides for a machine tool pool and a facilities expansion program.

3. Certain specialized minerals legislation authorizing the acquisition of specific amounts of certain named minerals. These include the Domestic Minerals Program Expansion Act of 1953 (Public Law 206, 83rd Congress) and the Domestic Tungsten, Asbestos, Fluorspar, and Columbium-Tantalum Production and Purchase Act of 1956 (Public Law 733, 84th Congress).

4. The Agricultural Trade Development and Assistance Act of 1954. (Public Law 480, 83rd Congress). Title I of the Act provides for the creation of the supplemental stockpile of strategic and critical materials. Title III provides for barter of agricultural commodities for strategic materials which entail less risk from deterioration and spoilage as well as substantially lower storage charges. Stockpiles from the supplemental stockpile cannot be released for use without congressional approval.

5. Agricultural Act of 1956. (Public Law 540, 84th Congress).

This law authorized the transfer of materials acquired under the act by the Commodity Credit Corporation as a result of barter (unless acquired for the national stockpile) to the supplemental stockpile.

6. Federal Facilities Corporation Act of 1956 (Public Law 608, 84th Congress.).

This law, primarily concerned with the sale of the Federally owned tin smelter in Texas City, Texas, provided authority for further stockpiling of tin.

7. The Federal Civil Defense Act of 1950 (Public Law 920, 81st Congress.).

This act authorized the Federal Civil Defense Administrator (now Director of the Office of Civil and Defense Mobilization) to "procure by condemnation or otherwise, construct, lease, transport, store, maintain, renovate or distribute materials and facilities for civil defense, with the right to take immediate possession thereof."

8. National Industrial Reserve Act of 1948 (Public Law 883, 80th Congress).

This act provides for a reserve of machine tools and industrial manufacturing equipment from which essential needs of the Armed Forces or defense-supporting industries are supplied as directed by the Secretary of Defense.

9. The stockpiles of agricultural commodities under the Federal Government's price support program are currently administered by the Commodity Credit Corporation in accordance with the authority of the Commodity Credit Corporation Charter Act of June 29, 1948 (Public Law 806, 80th Congress) and the Agricultural Act of 1949 (Public Law 439, 81st Congress).

Stockpiling of critical and strategic materials

A number of different stockpiles have been developed under the various acts just mentioned. In this section are considered the stockpiling programs of critical and strategic materials. Those of civil defense needs, the supplies of machine tools and plants, and the agricultural surpluses are discussed in subsequent sections.

Critical and strategic materials are divided into the five stockpiles, as shown in Table I, which is taken from the Ninth Annual Report of the Joint Committee on Defense Production, January 13, 1960 (86th Congress, 2d Session, House Report No. 1193), p. 29.

Table I

Summary of Government inventories of strategic and critical materials, June 30, 1959

	Inventory		On order acquisition cost
	Acquisition cost	Market value 1/	
National stockpile (Public Law 520):			
Stockpile grade	$5,916,844,000	$5,784,864,400	2/ 45,987,000
Nonstockpile materials	299,383,300		
Total	6,216,227,300		
Defense Production Act inventory (Public Law 744):			
Stockpile grade	3/ 943,017,100	704,477,100	4/ 510,751,000
Nonstockpile materials	425,169,900		
Total	1,368,187,000		
Supplemental stockpile (Public Law 480):			
Stockpile grade	581,227,700	5/ 573,761,200	
Nonstockpile materials	22,911,500		
Total	604,139,200		
Commodity Credit Corporation inventory (Public Law 480):			
Stockpile grade	93,701,400	86,659,600	161,251,000
Nonstockpile materials	4,808,900		
Total	98,510,300		
Federal Facilities Corporation (Public Law 608): Stockpile grade - tin	9,519,100	9,096,200	
Subtotals:			
Stockpile grade	7,544,309,300	7,158,858,500	717,989,000
Nonstockpile grade	752,273,600		
Grand total	8,296,582,900	7,158,858,500	717,989,000

1/ Market value of nonstockpile materials not available.
2/ Includes materials valued at $10.8 million to be transferred from International Cooperation Administration account at no cost to the stockpile; also $4.5 million cost of upgrading certain materials now in inventory.
3/ Does not include work in process (Nicaro nickel and mica) totaling $524,577.
4/ Value of materials at market prices which it is reasonable to assume Government will be required to accept under Defense Production Act expansion program contracts.
5/ Includes transfer of $27.5 million ($26.7 million material costs and $0.8 million accessorial costs) from Department of the Interior inventory acquired under Public Law 733.

Note. -- Nonstockpile materials include materials in Government inventories not having stockpile objectives or not meeting stockpile specifications.

A brief summary of each of these five stockpiles follows.

1. National stockpile. This is by far the largest of the stockpiles of critical and strategic materials, accounting for $6.2 billions out of a total of $8.3 billions acquisitions cost of the Government inventories. It was authorized by the Strategic and Critical Materials Stock Piling Act.

As of June 30, 1959 there were 73 materials being stockpiled in the national stockpile. They are shown in Table II as follows.

Table II

STATUS OF STRATEGIC STOCKPILE INVENTORIES, JUNE 30, 1959

Materials	Inventory equals or exceeds: Basic objective	Maximum objective
1. Abrasive, Crude Aluminum Oxide	x	x
2. Aluminum	x	x
3. Antimony	x	x
4. Asbestos, Amosite		
5. Asbestos, Chrysotile	x	x
6. Asbestos, Crocidolite	x	x
7. Bauxite, Metal Grade, Jamaica Type	(1)	(1)
8. Bauxite, Metal Grade, Surinam Type	x	
9. Bauxite, Refractory Grade	x	x
10. Beryl	x	x
11. Bismuth	x	(1)
12. Cadmium	x	x
13. Castor Oil	x	x
14. Celestite	x	x
15. Chromite, Chemical Grade	x	
16. Chromite, Metallurgical Grade	x	x
17. Chromite, Refractory Grade	x	x

Materials	Inventory equals or exceeds: Basic objective	Maximum objective
18. Cobalt	x	(1)
19. Columbite	x	x
20. Copper	x	x
21. Cordage Fibers, Abaca		
22. Cordage Fibers, Sisal		
23. Diamond Dies, Small		
24. Diamond, Industrial: Crushing Bort	x	x
25. Diamond, Industrial: Stones	x	
26. Feathers and Down, Waterfowl	x	x
27. Fluorspar, Acid Grade	x	x
28. Fluorspar, Metallurgical Grade	x	x
29. Graphite, Ceylon--Crystalline and Amorphous	x	x
30. Graphite, Madagascar--Crystalline Flake and Fines	x	x
31. Graphite, Other Than Ceylon and Madagascar--Crystalline	x	x
32. Hyoscine	x	x
33. Iodine	x	
34. Jewel Bearings		
35. Lead	x	x
36. Magnesium	x	x
37. Manganese, Battery Grade, Natural Ore	x	x
38. Manganese, Battery Grade, Synthetic Dioxide	x	x
39. Manganese, Chemical Grade, Type A Ore	x	x
40. Manganese, Chemical Grade, Type B Ore	(1)	
41. Manganese, Metallurgical Grade	x	x
42. Mercury	x	x

Materials	Inventory equals or exceeds: Basic objective	Maximum objective
43. Mica, Muscovite Block, Stained A/B and Better	x	
44. Mica, Muscovite Film, First and Second Qualities	x	
45. Mica, Muscovite Splittings	x	x
46. Mica, Phlogopite Splittings	x	x
47. Molybdenum	x	x
48. Nickel	x	x
49. Opium	x	x
50. Palm Oil	x	
51. Platinum Group Metals, Iridium	x	x
52. Platinum Group Metals, Palladium	(1)	(1)
53. Platinum Group Metals, Platinum	x	x
54. Pyrethrum	x	x
55. Quartz Crystals	x	x
56. Quinidine	x	x
57. Rare Earths	x	x
58. Rubber, Crude Natural	x	x
59. Selenium		
60. Shellac	x	
61. Silicon Carbide, Crude	(1)	(1)
62. Silk, Raw	x	x
63. Silk Waste and Noils	x	x
64. Sperm Oil	x	x
65. Talc, Steatite Block	x	
66. Tantalite	x	x
67. Tin	x	x
68. Tungsten	x	x
69. Vanadium	x	x
70. Vegetable Tannin Extract, Chestnut	x	x
71. Vegetable Tannin Extract, Quebracho	x	x
72. Vegetable Tannin Extract, Wattle	x	
73. Zinc	x	x

1/ Sufficient quantities are on hand in other Government-owned inventories to complete the objectives.

Source: U. S. Office of Civil and Defense Mobilization. Stockpile report to the Congress, January - June 1959.

Effective July 1, 1959 two materials, corundum and sapphire and ruby, were restored to the stockpile list, increasing the total to 75. During the fiscal year 1959 only four materials were being procured for the national stockpile: amosite asbestos, small diamond dies, jewel bearings, and muscovite block and film mica.

2. Defense Production Act inventories. The cost of the Defense Production Act inventories as of June 30, 1959 amounted to $1,368 million. Nearly 90 percent of the deliveries made under this act consisted of aluminum, copper, manganese, and nickel. Some of the purchases made under this act have been sold to the national stockpile and others to private contractors. During the fiscal year 1959 there were no transfers of strategic materials from the DPA inventory to the national stockpile, as funds were not appropriated for this purpose. The minerals acquired under the Domestic Minerals Program Extension Act of 1953 - asbestos, beryl, chromite, columbium-tantalum bearings ores, manganest, mica, and tungsten - have been added to the Defense Production Act inventories. According to the OCDM, as reported in the 9th Annual Report of the Joint Committee on Defense Production, "the inventories of these materials on hand and on order exceed the maximum stockpile objectives, and for most of the materials the quantities are far in excess of the maximum objectives.... The Government inventories of beryl on hand and on order are almost twice the amount of the maximum stockpile objective."

3. The supplemental stockpile, authorized by the Agricultural Trade Development and Assistance Act of 1954 (sec. 1-4 (b), Public Law 480, contains materials acquired by barter for surplus agricultural commodities and also the inventory acquired under the Domestic Tungsten, Asbestos, Fluorspar, and Columbian-Tantalum Production and Purchase Act of 1956. As of June 30, 1959 it consisted of 30 materials valued at $604.1 million at acquisition cost, of which $491.4 million was in excess of the maximum stockpile objectives. Bauxite, chromite, fluorspar, lead, manganese, and zinc make up about 85 percent of the materials at cost meeting stockpile specifications which are in excess of the maximum stockpile objectives.

4. Commodity Credit Corporation inventory. Under Public Law 480, 83rd Congress, and Public Law 540, 84th Congress, the Commodity Credit Corporation has in its inventories and not yet transferred to the supplemental stockpile bartered materials with an acquisitions cost of $98.5 millions of which $60.3 millions are materials in excess of maximum stockpile objectives.

5. Stockpiles of tin, provided for by the Federal Facilities Corporation Act of 1956, totalled $9.5 million on June 30, 1959.

Of the total of $8.3 billion of strategic and critical materials, based on acquisition cost, in these five stockpiles, over half, or $4.3 billions, are materials stockpiled in excess of the maximum stockpile objectives.

Details are shown in the following table taken, like table I, from the 9th annual report of the Joint Committee on Defense Production (p. 39).

Table III
Summary of Government inventories of strategic and critical materials, June 30, 1959
(Maximum stockpile objective: Market value, $4,147,346,000)

	Total inventory		Excess to maximum stockpile objective	
	Acquisition cost	Market value	Acquisition cost	Market value
A. Inventories having stockpile objectives:				
(1) Meeting stockpile specifications:				
National stockpile	$5,916,844,000	$5,784,864,400	$2,086,813,900	$1,908,388,600
Supplemental stockpile	531,227,700	573,761,200	468,514,400	462,338,300
Defense Production Act	943,017,100	704,477,100	893,167,300	664,410,500
CCC barter	93,701,400	86,659,600	55,461,600	54,293,200
RFC (FFC Texas smelter)	9,519,100	9,096,200	9,519,100	9,096,200
Total	7,544,309,300	7,158,858,500	3,513,476,300	3,098,526,800
(2) Not meeting stockpile specifications: 1/				
National stockpile	95,746,500	----------	95,746,500	----------
Supplemental stockpile	4,805,900	----------	4,805,900	----------
Defense Production Act	250,117,770	----------	250,117,770	----------
CCC barter	702,400	----------	702,400	----------
RFC (FFC Texas smelter)	0	----------	0	----------
Total	351,372,500	----------	351,372,500	----------
B. Inventories not having stockpile objectives: 1/				
National stockpile	203,636,800	----------	203,636,800	----------
Supplemental stockpile	18,105,600	----------	18,105,600	----------
Defense Production Act	175,052,200	----------	175,052,200	----------
CCC barter	4,106,500	----------	4,106,500	----------
RFC (FFC Texas smelter)	0	----------	0	----------
Total	400,901,100	----------	400,901,100	----------
C. Summary:				
National stockpile	6,216,227,300	----------	2,386,197,200	----------
Supplemental stockpile	604,139,200	----------	491,425,900	----------
Defense Production Act	1,368,187,000	----------	1,318,337,200	----------
CCC barter	98,510,300	----------	60,270,500	----------
RFC (FFC Texas smelter)	9,519,100	----------	9,519,100	----------
Total	8,296,582,900	----------	4,265,749,900	----------

1/ Market value has not been calculated due to the mixed nature of individual commodities such as different types, quality, and grades as well as lack of active trading which would create current market values.

Source: General Services Administration.

The goals for stockpiling strategic and critical materials have changed in aggregate quantities and in specific items over the years. Before 1958, for example, over-all stockpile goals were based on maintaining a stockpile equal to the needs of five years' normal use. Largely as a result of the recommendations by the Special Stockpile Advisory Committee of the Office of Defense Mobilization noted above, the goals were adjusted downward to meet the needs of three years' normal use.

Two stockpile objectives are recognized:

(1) the basic stockpile objectives which represents the deficit in supplies to meet the industrial and military needs of the country for defense after allowing for U. S. production and imports from world sources, the latter discounted in varying degrees according to estimated strategic risks involved; and

(2) the maximum objectives, computed in the same way except that imports only from nearby areas, such as Canada, Mexico, and Cuba, are included.

At the present time cash procurement for the stockpile is limited to meeting the basic objectives. By June 30, 1959, the basic stockpile objectives were reached for 67 of the 73 commodities and maximum stockpile objectives for 55.

About a third of the stockpile materials are not produced at all in this country or only in insignificant quantities. Only three of them - molybdenum, magnesium, and vanadium - are available in such quantities as to make the United States wholly self-sufficient under peacetime conditions.

The stockpile has been accumulated as an industrial materials stockpile, rather than as an end-product inventory. Thus it contains minerals, metals, industrial oils, fibers, and such other agricultural materials as crude natural rubber and gum opium. All are basic to manufacturing, but not directly usable by the ultimate consumer.

The over-all costs for stockpiling these strategic and critical materials is shown in the following table, "Expenditures of Funds for Stockpiling Strategic and Critical Materials, Fiscal Years 1947-1959."

TABLE IV

Expenditures of Funds for Stockpiling Strategic and Critical Materials, Fiscal Years 1947-1959
(in millions of dollars)

	Cumulative From Fiscal Year 1947 Through Fiscal Year 1956	Fiscal Year 1957	Fiscal Year 1958	Fiscal Year 1959	Cumulative Through June 1959
Expenditures					
Gross Total	5,533.6	415.5	210.5	104.2	6,263.8
Less: Adjustments for Receipts from Rotation Sales and Reimbursements	404.6	60.9	36.8	38.9	541.2
Net Total	5,129.0	354.6	173.8	65.3	5,722.6
Material Acquisition Costs, Total	4,907.9	322.9	143.4	46.7	5,420.8
Stockpile Maintenance Costs, Total	191.0	28.7	27.6	15.8	263.2
Facility Construction	43.9	0	*	-.2	43.8
Storage and Handling Costs	120.2	13.5	15.6	17.4	166.7
Net Rotation Costs	26.9	15.3	12.0	-1.4	52.7
Administrative Costs	30.2	2.9	2.7	2.8	38.6

* Less than $500,000

Source: U. S. Office of Defense Mobilization. Stockpile Reports to the Congress.

From this table it can be seen that in general the costs of acquiring stockpile materials has been cut back sharply as the stockpiling goals become ever closer to realization. On the other hand, as one might expect, the storage and handling costs continue to mount, reaching a total of over $17 million in fiscal year 1959.

The storage and maintenance of the stockpile of strategic and critical materials is a matter of much concern. As of June 30, 1959, these materials in the national stockpile were stored at 217 locations in various parts of the country in the following types of facilities:

Military depots	62
GSA depots	18
Other Government-owned sites	7
Industrial plantsites	38
Leased commercial sites	13
Commercial warehouses	79

This storage space consists of approximately 25 million square feet of closed storage, 55 million square feet of open storage, and 2 million barrels of tank storage. Exact locations of the storage sites are not disclosed for reasons of national security.

The number and types of locations have undergone considerable change in the course of the last ten years. Since the end of 1952 until the end of 1957 there has been a steady decline in the number of sites. On December 31, 1952 there were 323 sites, and on December 31, 1957, five years later, 218. In this five year period, there was a decrease of 12 military depots used for

Source: U. S. Office of Defense Mobilization. Stockpile Reports to the Congress.

* Less than $500,000

stockpiling strategic and critical materials, an increase of 8 GSA depots, an increase of 22 industrial plant sites, a decrease of 86 commercial warehouses, and a decrease of 34 commercial tank facilities.

One of the major problems involved in the management of the strategic stockpile is the need for periodic rotation of perishable commodities. This is significant for such commodities as rubber, cordage fibers (abaca and sisal), and shellac. Commodities, some or all of the supply of which have recently been authorized for disposal because of obsolescence include agar, hog bristles, castor oil, coconut oil, synthetic cryolite, kyanite-mullite, opium poppy seed, pyrethrum, quinine and totaquine, baddeleyite, feathers and down, silk waste and noils, sperm oil, and guayule seeds.

It is generally recognized that the strategic stockpile programs outlined above are geared to the objective of increasing the military strength of the nation in case of outbreak of war, but would contribute relatively little to meeting the immediate needs of the civilian population immediately following a nuclear attack. This was indicated particularly forcefully by Mr. H. B. McCoy, Administrator of the Business and Defense Services Administration, Department of Commerce, in his statement before the Joint Committee on Defense Production on July 10, 1958:

"If survival requirements for a postnuclear attack were taken into account in considering materials now in the stockpile, only a

few of the stockpile levels would have to be adjusted inasmuch as an entirely different category of items would be involved. For the time being, the uncertainties connected with potential postattack rehabilitation needs are so great that any worthwhile evaluation must not only await a clearer definition but development of basic policy. Hence, it is not practicable at this time to relate them to the strategic stockpile. However, the Department [of Commerce] strongly supports the view of the Special Stockpiling Advisory Committee that provision for survival, relief, and rehabilitation needs should be separately programed and financed.

"It seems to us that procedures for developing requirements and for the management and storage of stocks for survival would probably depart so radically from those used for the strategic stockpile that any attempt to combine the operations would result in a prolonged confusion to the detriment of the mobilization program. Thus, for greater effectiveness, plans for maximum use of existing survival resources and for their augmentation where necessary should be developed apart from strategic stockpile planning, but they should be coordinated when materials common to both are involved."[1/]

Leo A. Hoegh, Director of the Office of Civil and Defense Mobilization, himself, appearing before the Joint Committee on

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1/ U. S. Congress. Joint Committee on Defense Production. Defense Production Act. Progress Report - No. 42. Hearing ... July 10, 1958. p. 36.

Defense Production, testified that the current 3-year objectives for stockpiling under the national stockpile program are limited essentially to meeting conditions of war without attack on this country. One of the important activities of the OCDM at the present time is to determine the role of these stockpile materials in relation to general war with nuclear attack, including the problem of postattack recovery. The Joint Committee on Defense Production in its annual report issued on January 13, 1960, concluded:

"Indications are that some months will be required to determine both military requirements and rehabilitation needs, taking into account all the pertinent factors to be considered in case of an attack."

Of course in the longer subsequent period of recovery and rehabilitation, these stockpiles of raw materials may have very substantial value. There can be no question, however, that for the period immediately following an attack, an entirely different category of stockpiled materials will be needed. These would include essential repair parts for critical utilities and other facilities needed for survival, medical supplies and equipment, more widely dispersed stocks of food and potable water, basic construction components, tools, etc.

These problems are receiving far less attention than the pressures of various producer groups opposing reduction of the various stockpiles and urging continued stockpiling of specific commodities, the costs of the program, and the effect of these stockpiles on civilian

markets. However these aspects of the stockpile program, and the criticisms associated with them, are outside the scope of this report.

Civil Defense Stock-pile Programs

Of all the stockpile programs of the Federal Government, to date only the civil defense stockpile of the Office of Civil and Defense Mobilization appears to be immediately and directly concerned with dealing with a post-attack situation. During the eight year period, fiscal years 1951-1958, the Federal Civil Defense Administration[1/] spent $212,450,000 for emergency supplies and equipment. About $200 million, or 94 percent of this total was spent for medical supplies and equipment. The remaining 6 percent was spent for engineering supplies and equipment ($6.9 million), radiological and chemical warfare defense equipment ($9.1 million), and warehousing and maintenance of the stockpile ($8.2 million). The difference between the $212 million reported as appropriated and the total of $224 million in obligations is accounted for by transfers from other accounts and the lapse of unobligated balances.

This stockpile represents about 50 percent of the goal set in 1952 which assumed an attack by low-yield atomic weapons and a probable need to take care of 5 million casualties for 21 days. This goal itself is widely recognized, as the annual report issued by the Office of Civil and Defense Mobilization on November 24, 1959 itself states, as "now inadequate."

1/ Merged with the Office of Defense Mobilization to form the Office of Civil and Defense Mobilization effective July 1, 1958.

As of June 30, 1957 the bulk of the civil defense stockpile, valued at nearly $200 million was located at 45 depots in 23 States, including Alaska and Hawaii, and Puerto Rico. The largest stockpiles were located at Somerville, New Jersey (valued at $24.9 million), and at Mechanicsburgh, Penna. (valued at $11.8 million).

Within the past year, one of the most important aspects of OCDM's civil defense stockpiling program, has been the procurement of nearly 2,000 emergency hospitals. These emergency hospitals are designed to be set up in schools, churches or other suitable buildings in time of emergency. As of March 31, 1959, all components which were ordered for 1,932 emergency hospitals have been delivered except for operating tables, of which only partial delivery has been made. Of these 1,932 hospitals, the packaging and assembly has been completed on 1,363. Sixty-six are on loan for training and education in 40 States and the District of Columbia, 345 were stored in OCDM warehouses throughout the nation, and 952 stored under custody of the States in the pre-positioning program. Under this pre-positioning program, these hospitals are offered to the States for location in or near facilities within their jurisdictions where they may be utilized during a civil defense emergency. The program is designed for the safe permanent storage of hospitals in unopened original containers at or near the places of eventual use, where they can be unpacked and be put into operational use with a minimum of delay. As of March 31, 1959, the allotment and location of these pre-positioned hospitals by State is shown in the following table:

Table V

Pre-Positioned Hospitals

By States as of March 31, 1959

OCDM Region	Allotment	Percent Pre-positioned	Total Pre-positioned
TOTAL	1,576	60	952
REGION 1	264	44	116
Connecticut	28	96	27
Maine	4	100	4
Massachusetts	77	48	37
New Hampshire	3	67	2
New Jersey	87	38	33
New York	50	0	-*
Rhode Island	14	57	8
Vermont	1	500	5
REGION 2	392	84	328
Delaware	5	0	-
Dist. of Columbia	17	0	-
Kentucky	17	94	16
Maryland	39	56	22
Ohio	108	100	108
Pennsylvania	163	96	156
Virginia	30	63	19
West Virginia	13	54	7
REGION 3	149	52	78
Alabama	21	95	20
Florida	30	97	29
Georgia	25	16	4
Mississippi	3	0	-
North Carolina	18	106	19
South Carolina	11	0	-
Tennessee	27	22	6
Canal Zone	0	0	-
Puerto Rico	14	0	-
Virgin Islands	0	0	-
REGION 4	323	56	181
Illinois	127	38	48
Indiana	35	40	14
Michigan	85	48	41
Missouri	45	84	38
Wisconsin	31	129	40

OCDM Region	Allotment	Percent Pre-positioned	Total Pre-positioned
REGION 5	122	37	45
Arkansas	5	100	5
Louisiana	23	70	16
New Mexico	4	0	-
Oklahoma	12	33	4
Texas	78	26	20
REGION 6	84	83	70
Colorado	13	62	8
Iowa	16	69	11
Kansas	11	73	8
Minnesota	28	100	28
Nebraska	8	100	8
North Dakota	3	100	3
South Dakota	2	50	1
Wyoming	3	100	3
REGION 7	199	45	90
Arizona	9	78	7
California	175	43	75
Nevada	1	0	-
Utah	7	57	4
American Samoa	0	0	-
Guam	0	0	-
Hawaii	7	57	4
REGION 8	43	102	44
Alaska	0	0	-
Idaho	1	100	1
Montana	1	0	-
Oregon	14	86	12
Washington	27	115	31

* The State of New York has procured 200 emergency hospitals under the Federal Contributions Program.

Source: U. S. Office of Civil and Defense Mobilization. Interim Statistical Report, March 31, 1959. p. 31

According to the Office of Civil and Defense Mobilization, as set forth in its annual report issued on November 24, 1959, health and sanitation supplies generally represent the most critical survival items. An appraisal of requirements for stockpiles of survival items was completed in 1958 and is currently being re-evaluated on the basis of new production and resource estimates. Postattack requirements factors for survival and recuperation are to be developed during the fiscal year 1961 for essential survival elements, beyond the health and sanitation supplies already appraised.

Food stockpiles

The most comprehensive reviews of the stockpiling of food from the point of view of requirements after a nuclear attack are those issued annually by the Under Secretary of Agriculture and published in the annual reports of the Joint Committee on Defense Production. 1/ The Under Secretary of Agriculture also issues quarterly supplementary reports to the Joint Committee on Defense Production.

In 1957, the Department of Agriculture estimated that inventories of wheat, rice, soybeans, peanuts, and dairy products would provide enough food for 109 days for our present population, and that if corn, oats, barley and other feed grains were used for food instead of for feeding livestock, this period would be about doubled. This estimate is based on a consumption rate of 2,900

1/ Especially the Eighth Annual Report (86th Congress, 1st Session, Senate Report No. 1), pp. 267-324; and the Ninth Annual Report (86th Congress, 2d Session, House Report No. 1193), pp. 160-207.

calories per man-day's supply of food.

A year later, at the end of 1958, the Department of Agriculture reported that the stocks owned or under loan by the Commodity Credit Corporation represented more than 2 years' domestic civilian use of wheat, over three quarters of a year's supply of cotton, nearly a year's supply of grain sorghums and nearly 6 months' domestic supply of corn. Dairy products owned by the CCC amounted to only a few days' supply.

The value of all Commodity Credit Corporation agricultural stocks currently amounts to about $9.2 billion.

The adequacy of these stocks for a post-nuclear attack depends of course on many variables, including the immediate and long-term effects of an attack both on the population of the United States and on its food stocks. Much will, ultimately, depend on the effect of fall-out on agricultural land. On the basis of 1959 hearings held by the Special Subcommittee on Radiation of the Joint Committee on Atomic Energy it has been estimated (1) that growing wheat, subjected to fallout as a result of nuclear war, would not be rendered unfit for consumption if the radiation level permitted workers to grow and harvest crops, and (2) that large scale nuclear attacks probably would destroy a far larger percentage of the population than of the supply of stored wheat. How much land would be subject to fall-out of such magnitude as to make agricultural land unsuitable for cultivation for an extended period of time appears to be entirely conjectural. It may be well to bear in mind, however, the statement recently made by Merril Eisenbud, professor of industrial medicine at the New York University-Bellevue Medical Center:

"Every speck of fallout should remind us that nuclear bombs exist in dreadful quantities which, if used in war, could make millions of square miles uninhabitable for life above ground. The threat of fallout in nuclear war is the greatest threat to man's survival since the plagues of medieval times."[1/]

There is, of course, a wide range in the vulnerability of various kinds of foods and other agricultural commodities to nuclear attack. Using the assumptions of the Operation Alert, 1958, the Department of Agriculture has estimated that on-farm storage of grains would not be affected very seriously. It has estimated the following quantities of grains and potatoes on farms before and after a postulated nuclear attack.

1/ Eisenbud, Merril. Fallout: What we do and don't know. New York Times Magazine, January 10, 1960. p. 80.

Table VI
Estimated preattack and postattack quantity and percentage remaining of on-farm stocks of food and feed grains, hay and white potatoes for the United States

Commodity	Preattack quantity	Postattack quantity	Percentage remaining
	Thousand pounds	Thousand pounds	Percent
Grains:			
All wheat	8,603,940	8,571,420	99.6
Rye	420,168	401,072	95.4
Corn	82,872,104	80,989,776	97.7
Oats	11,876,192	11,566,752	97.4
Barley	4,670,496	4,581,120	98.0
Sorghum grains	3,199,280	3,050,208	95.3
Soybeans	4,654,200	4,347,240	93.4
Rice (rough)	151,000	127,600	84.5
Hay	52,962,000	51,712,000	97.6
White potatoes	334,200	282,000	84.4

Source: U. S. Department of Agriculture. National Damage Assessment Report on Food and Agricultural Resources, Operation Alert, 1958.

On the other hand, stocks of consumable food stored off the farm would be far more vulnerable to attack. For example, only 30 percent of prewar quantities of fresh, frozen, and processed foods would be expected to be available after an attack, fluid milk would be reduced to 29 percent the pre-attack supply, bakery products to 45 percant, white potatoes to 30 percent and flour and cereals to 72 percent. The following table provides more complete statistics of these potential declines in stocks.

Table VII

Estimated preattack and postattack quantity and remaining percentage of off-farm stocks of consumable food, by groups and subgroups for the United States 1/

Food group and subgroup	Preattack quantity	Postattack quantity	Percentage remaining
Meat and meat substitutes:	1,000 pounds	1,000 pounds	Percent
Meats, fresh, frozen, and processed	799,400	241,500	30
Poultry, eggs, and seafood	724,320	422,622	58
Dry beans and nuts	1,330,369	969,854	73
Milk group:			
Fluid milk	336,806	97,040	29
Dry milk and cheese	659,268	348,081	53
Evaporated and condensed milk 2/	215,925	147,827	68
Fats and oils, food:			
Butter and margarine	216,126	67,907	31
Other fats and oils	1,319,199	318,300	24
Grain products:			
Flour and cereals	1,664,577	1,199,713	72
Bakery products	286,285	129,989	45
Fruits and vegetables:			
Fruits, fresh, canned, and frozen	3,939,000	2,004,000	51
Vegetables, fresh, canned and frozen	5,615,000	3,120,000	56
Potatoes, white	191,000	58,000	30
Dried and concentrated (fruits and vegetables)	422,000	188,000	45
Sugar and sweets:			
Sugar, all types	4,060,568	2,882,512	71
Sirup and other sweets	465,282	280,671	60

1/ Includes all off-farm consumable food stocks in commercial distribution channels, except retail inventories. Consumable food includes all supplies that may be used directly for human consumption without further commercial processing.

2/ Includes ice cream.

Source: U. S. Department of Agriculture. National Damage Assessment Report on Food and Agricultural Resources, Operation Alert, 1958.

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The Commodity Credit Corporation reported that at the end of 1958 the following percentages of CCC owned stocks of major farm commodities were located in critical target areas:

cotton - 15.5 percent
dairy products - 41.8 percent
wheat - 18.1 percent
rice - 50.8
corn - 5.4 percent
other grain - 14.6 percent
tobacco - 1.9 percent

Table VIII shows the location by State of the stocks of grain owned by the Commodity Credit Corporation.

Table VIII
Grains: CCC-owned stocks, September 30, 1959

Table VIII
Grains: CCC-owned stocks, September 30, 1959
(All data in 1,000 bushels except grain sorghums in 1,000 cwt.)

State	Wheat	Rye	Corn	Oats	Barley	Grain sorghums	Soybeans	Flax-seed
Maine	40	-	1,029	192	-	-	-	-
Massachusetts	392	-	525	-	7	-	-	-
New York	21,531	8	21,756	146	50	-	-	-
New Jersey	661	-	296	-	5	-	-	-
Pennsylvania	1,025	25	3,279	199	1	-	-	-
Ohio	22	-	32,508	6	-	-	291	-
Indiana	4	1/	70,515	13	-	-	910	-
Illinois	34	-	283,928	510	3	31	7,559	-
Michigan	13	-	15,301	1/	-	-	4	-
Wisconsin	26,008	19	12,698	421	844	-	362	5
Minnesota	61,476	571	110,886	5,017	10,170	-	9,438	35
Iowa	1,009	-	358,646	236	13	765	15,823	-
Missouri	30,603	128	27,075	136	370	7,253	850	-
North Dakota	49,782	1,482	2,344	3,503	23,143	-	577	32
South Dakota	31,637	1,174	62,785	6,443	2,762	360	243	13
Nebraska	119,061	179	128,074	354	381	25,718	1,128	-
Kansas	375,185	127	11,906	274	603	35,803	23	1/
Maryland	5,231	-	244	199	36	-	-	-
Virginia	15,441	-	938	-	-	-	-	-
North Carolina	13	-	5	-	-	-	-	-
South Carolina	14	-	-	-	-	-	-	-
Georgia	16	-	-	-	4	-	46	-
Kentucky	9	-	315	-	-	-	-	-
Tennessee	2,165	-	-	-	-	350	-	-
Alabama	348	-	-	-	-	-	-	-
Mississippi	91	-	1	-	-	254	-	-
Arkansas	5,497	-	-	-	1/	1,654	1	-
Louisiana	10,730	-	-	-	-	3,507	-	-
Oklahoma	97,740	-	5	9	2	3,322	134	-
Texas	114,879	-	15	1,483	474	156,199	1	-
Montana	21,979	79	-	22	4,849	-	-	1
Idaho	3,944	-	230	448	308	249	-	1
Wyoming	1,940	1	94	-	6	-	-	-
Colorado	27,166	3	855	1	3	1,047	-	-

Table VIII (cont.)

State	Wheat	Rye	Corn	Oats	Barley	Grain sorghums	Soybeans	Flax-seed
New Mexico	2,866	-	28	-	-	1,280	-	-
Arizona	-	-	-	-	-	2,741	-	-
Utah	1,361	3	-	-	1	762	-	-
Nevada	-	-	-	-	-	926	-	-
Washington	41,616	559	123	2,784	16,382	1,319	-	-
Oregon	30,504	9	67	2,829	7,787	5,617	-	-
California	3,061	-	517	746	5,634	17,475	-	520
Dallas area 2/	1,422	-	-	-	12	882	-	-
Evanston area 2/	455	2	5,664	629	-	9	4,191	-
Kansas City area 2/	12,350	225	-	53	390	1,993	140	-
Minneapolis area 2/	367	33	793	-	523	-	-	58
Portland area 2/	224	20	-	10	234	112	-	-
Total	1,119,912	4,647	1,153,445	26,663	74,997	269,628	41,721	665

1/ Less than 500 bushels.
2/ In transit.

CSS Grain Division

Source: Grain Market News, October 23, 1959 (Grain Division, Agricultural Marketing Service, U. S. Department of Agriculture).

From this table it can be seen that stocks of the major grains are widely distributed in the various parts of the nation. However, as one would expect, the major part is located in the grain producing centers of the Midwest. For example, the tier of states, North Dakota, South Dakota, Nebraska, Kansas, Oklahoma and Texas, together contained 70.4 percent of the CCC-owned stocks of wheat as of September 30, 1959; Kansas alone accounted for 33.5 percent of the total CCC-owned stocks throughout the nation. Similarly the four States of Illinois, Iowa, Minnesota and Nebraska accounted on September 30, 1959, for 76.4 percent of all CCC-owned stocks of corn; Iowa itself accounted for 31.1 percent.

Most of these areas are outside of major centers of industry and population and therefore these stocks of grain can be considered relatively safe from major damage in a nuclear attack. Nevertheless, major problems of conversion into flour, meal, meat and other products usable for human consumption and of transportation and distribution to the surviving population remain. For food to reach survivors after an attack will require transportation facilities and equipment, proper containers for harvesting, processing, and shipping, minimum processing facilities and supplies, and emergency distribution arrangements.

Normally agriculture accounts for about a quarter of all the ton-miles of truck and railroad transportation. After an attack, transportation of minimum requirements of food would have to be given the highest priority for available transportation facilities. These will require detailed preattack planning.

The Department of Agriculture has estimated that, until extensive shelters are built to protect the people, the proportion of food resources that would survive would probably be greater than of the population. In any case, people will have to maintain enough food in their homes to meet their own needs during such period when fallout could make it unsafe to get food from otherwise available sources. It is the opinion of the Department, based on current knowledge, that each family should acquire and maintain a stock of food sufficient for the family for at least 2 weeks, and that such home food stocks should consist of foods which can be prepared for family consumption even if gas and electricity for cooking are shut off. It believes that nearly all areas of the nation have at least two weeks' stocks of food in retail and wholesale stocks and that these would be usable in areas wherever the surviving population can get to them. It is further the opinion that, since adequate supplies of domestically produced foods are likely to be available on a national basis following an emergency, that it is unnecessary to augment such supplies with a special national food stockpile unless shelters are built; and as a corollary that any plans for a national shelter program should include plans to stock such shelters with food. The Office of Civil and Defense Mobilization in 1959 issued an advisory bulletin, No. 234, entitled "Individual and Family Survival Requirements" which includes a list of recommended foods for emergency stockpiles in the home.

The stockpiling of food by individual householders has thus far received little practical attention. Similarly stockpiling of other survival items is still in a rudimentary planning stage. The Office of Defense Mobilization in 1956 originated a program to determine the criteria and the development of a list of items deemed essential to the maintenance of life in the event of an attack upon the United States.

During the last quarter of 1957, the Business and Defense Services Administration of the Department of Commerce completed its plans for surveys of the producers of some of the most important of these items. By September 1959, the BDSA had completed 131 surveys covering producers of survival items, as well as surveys covering wholesale inventories of these items in eight different wholesale trade areas. Its current activities in this area are reported as follows:

"Currently underway, or planned, are surveys covering: (1) producers of glass and metal food and medicinal containers; (2) inventories of survival items held by water and sewerage utilities; (3) communications services; (4) transportation services. Completion of supply-requirements studies covering survival items will undoubtedly point up other areas, including alternate items which will have to be surveyed.

"BDSA collaborated with HEW in supply-requirements studies covering 98 medical survival items. Supply data were assembled covering production, civil defense stockpiles, inventories in the

hands of manufacturers, wholesalers and hospitals, and imports. Estimated postattack supply and production capability were related to postattack requirements in the studies to determine deficiencies. A number of remedial actions have been explored to alleviate deficiencies, such as increasing wholesale and retail inventory levels, barter of surplus agricultural products, recommendations to increase civil defense stockpiles, etc."[1/]

From this accounting by the EDSA, it is evident that stockpiling of these survival items has not proceeded beyond the survey stage, except for the normal inventories at the manufacturing, wholesale and retail level. No current Federal funds appear to be available for stockpiling most of the so-called survival items that would be essential for the remaining civilian population following a nuclear attack nor has any coordinated program for encouraging private stockpiling of such items been announced.

Reserves of industrial plants and machinery.

Although the reserves of plants and equipment maintained in readiness for use in a national emergency are not strictly comparable to the stockpiles of minerals or surplus agricultural commodities, the existence of such reserves are relevant to recovery after a nuclear attack, both in and of themselves, and as precedents for facilities and equipment which might be better adapted to a post-attack situation.

1/ U. S. Congress. Joint Committee on Defense Production. Ninth Annual Report ..., January 13, 1960. (86th Congress, 2d Session, House Report No. 1193). p. 126.

The National Industrial Reserve Act of 1948 defines "national industrial reserve" as "that excess industrial property which has been or may hereafter be sold, leased, or otherwise disposed of by the United States, subject to a national security clause, and that excess industrial property of the United States which not having been sold, leased, or otherwise disposed of, subject to a national security clause, shall be transferred to the Administrator of General Services."

The national security clause refers to "those terms, conditions, restrictions, and reservations" to be inserted in instruments of sale or lease of property which will "guarantee the availability of such property for the purposes of national defense at any time when availability thereof for such purposes is deemed necessary by the Secretary of Defense."

The latest annual report of the Secretary of Defense on the National Industrial Reserve, issued on April 1, 1959, covering primarily the calendar year 1958, shows that the number of plants in the national industrial plant reserve has shrunk drastically, from 236 on Feb. 28, 1949 to 31 at the end of 1958. These 31 plants are distributed in 16 States as follows:

Pennsylvania	5	Alabama	1
Michigan	3	Iowa	1
New York	3	Louisiana	1
Ohio	3	Maine	1
Washington	3	Massachusetts	1
California	2	Nevada	1
Illinois	2	North Dakota	1
Indiana	2	Tennessee	1

The greatest decrease, a net drop of 61, occurred during the year 1958. This compares with a decrease of 62 during the four preceding years. The basic cause for this cut back in the industrial reserve is stated by the 1958 report as "the changed military concept from a long slow build up to the current one where little or no time will be available for putting plants back into production. It also results from the great change which has occurred since World War II in types of military weapons, moving from vast numbers of airplanes and cannon to many fewer airplanes armed with nuclear bombs and the change from conventional cannon to guided missiles."

With the exception of one plant which is idle and maintained at Government expense, all plants in the National Industrial Plant Reserve were in operation at the end of 1958 either producing raw materials or end items needed by the military, or producing civilian goods. At the same time the plants are kept in a state of mobilization readiness. Of the 31 plants, 28 have been sold by the government and are in private ownership, two are being operated by private corporations under lease or contract agreement, and the remaining one plant in the Reserve is being partially maintained at Government expense.

Of the 180 plants that have been removed from the National Industrial Plant Reserve since 1950, 59 were transferred to the plant reserves of the Army, Navy, and Air Force; 103 were dropped

because of cancellation of the National Security Clause; in nine cases the National Security Clause expired; 2 were transferred to other government agencies, and one was removed pursuant to Act of Congress.

This industrial plant reserve, like the national stockpile, is designed primarily to meet the military defense requirements of the country, but is of doubtful relevance to a post-nuclear attack situation. Of greater importance probably is the work of the Industry Evaluation Board in the Department of Commerce, which was established in 1951, under a National Security Council directive, to identify those relatively few products and services and their producing facilities, which "are of exceptional importance to industrial mobilization and national survival."[1] The main work of the Board has been to prepare a series of analyses of products and services selected through the application of criteria which attest to their essentiality and criticality. These analyses demonstrate the importance of their respective subjects to national defense and survival, enumerate the producing plants, list relevant information and statistical data concerning them, and indicate the importance of each plant to total national capability to produce the subject analyzed. Areas covered by these surveys in the fiscal years 1958 and 1959 were electronics, chemicals, metal cutting machine

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1/ U. S. Congress. Joint Committee on Defense Production. Ninth annual report, January 13, 1960. p. 127.

tools, aluminum, ferrous alloys, iron and steel, other essential metals and minerals, and automotive and equipment industries. These surveys have been designed for a number of uses, including estimating stockpile needs, assessment of postattack damage and restoration, and essential survival-item production.

Specific pilot studies are being undertaken assessing the postnuclear attack production capability of six specific items: antibiotics, surgical instruments, food pack cans, central office dial switching equipment, and a product of the Atomic Energy Commission. These studies, under the direction of a Government-Industry Task Group for Post-Attack Production established by the Business and Defense Services Administration of the Department of Commerce, are to take into account the effects of interruptions in transportation, power supply, communications, and other basic services, and also the direct effect of an attack on the labor force and the community services required for surviving labor and management to carry out their production responsibilities.

Fully as important as the plants in the National Industrial Plant Reserve and the surveys of essential plant facilities in the nation, is the available supply of machine tools. It is currently estimated that the Federal Government owns about 300,000 machine tools, valued at $3 billion. The military departments own approximately 270,000 of these tools of which about 4,000 are in the National Industrial Equipment Reserve in the custody of the General Services

Administration. This National Industrial Equipment Reserve has shown a decline similar in scope to the decline in the National Industrial Plant Reserve. Since the establishment of the program in 1949, the equipment reserve has received 40,415 items of equipment; 36,967 have been withdrawn, leaving on hand, at the end of 1958, 3,448 items of which 61 are on lease. Of the 2,272 items withdrawn during calendar year 1958, 2,192 items, with an acquisitions cost of $950,000 were removed from the Equipment Reserve as excess property based upon recommendations of the General Services Administration to the Assistant Secretary of Defense (Supply and Logistics). The remaining 80 items were transferred to the military departments for use in the production of military hardware. During the year 1958, a total of 979 items was added to the Equipment Reserve as a result of Department of Defense selections from screening listings of excess military equipment. The acquisitions cost of this equipment was $8,116,823 compared to acquisition cost of $1,048,728 for the 2,272 items withdrawn from the reserve. Therefore, although there was a net decrease of 1,293 items in the Equipment Reserve, the total acquisition cost showed a net increase of $7,068,095. Of the total items in the Equipment Reserve at the end of 1958, about 2,700 were metalworking machinery. The National Industrial Equipment Reserve program requires that equipment being retained for emergency use be operable when needed and that its performance capabilities be known and readily available to the prospective user when screening for needed tools.

As of the end of 1958, the machine tools and equipment in the National Industrial Equipment Reserve were stored in General Services Administration depots at Burlington, New Jersey and Dixon, Illinois. Arrangements were made with the Navy Department to utilize storage space at Clearfield, Utah, for tools being shipped from the West Coast and nearby locations. An additional 150,000 square feet of storage area at Dixon, Illinois were under contract for dehumidification, and a storage site at Jeffersonville, Indiana was being activated.

There are indications that thousands of Government-owned tools will continue to be declared surplus over the next three to five years. Therefore provision will have to be made for the storage of that portion of those tools which are selected annually for retention in the government reserve. Otherwise, such tools would be subject to being disposed of as surplus items.

The Office of Civil and Defense Mobilization in its annual report for the fiscal year 1959, released on November 24, 1959, noted that plans are in progress for the substantial enlargement of the National Industrial Equipment Reserve over a 3-year period and for channeling more tools to schools through the surplus property donation program of the Department of Health, Education, and Welfare. Further, a pilot operation is being started under which a complete complement of tools is being lent from the National Industrial Equipment Reserve to a State industrial training center, the Winston-Salem Forsyth County (North Carolina) Industrial

Education Center. If this experiment is considered to be successful, it is planned to lend equipment reserve tools to other similar training centers.

In addition to the National Industrial Equipment Reserve, the government maintains a Defense Mobilization Production Equipment Inventory, which is held by three agencies as follows, as of September 30, 1959.

Agency	Number of Items	Acquisition value
Maritime Administration	958	$2,853,817
General Services Administration	549	8,825,580
Atomic Energy Commission	49	1,927,304

The Department of Defense also maintains a Production Equipment Redistribution Inventory which, as of August 31, 1959, amounted to about 85,000 items. This reserve provides a nucleus of operable metalworking machinery for immediate use at mobilization and further includes items which may be allocated and redistributed to qualified users currently engaged in either direct military or defense-supporting production. During the year ending August 31, 1959, more than 6,200 items from this inventory were supplied to qualified equipment users.

Further steps taken to assure more adequate supply of machine tools in case of war include contracts entered into with four machine tool builders with the objective of enlarging their productive capacity to build large (elephant) machine tools, and a standby

pool order program, entitled the M-day machine tool trigger program. The latter program is a standby program under the Defense Production Act designed to make possible immediate use of machine tool productive capacity in the event of an emergency. At the end of fiscal year 1959 a total of 84 contracts for 14,675 items costing $220 million had been accepted by the Government. There will be no actual production, advances, or expenditures under this program until the Government notifies producers.

Conclusion:

As this report has shown, the stockpile programs of the Federal government are substantial and are a factor of considerable importance in planning to meet the state of emergency which would occur in the wake of a nuclear attack. The stockpiles of food and of medical and survival equipment already in being may well prove to be of incalculable worth if the country must bear the brunt of an enemy assault with atomic weapons.

It is apparent, however, that, with the exception of the civil defense stockpiling programs, none of the stockpiling currently undertaken by the Federal government has as a primary objective the capacity to alleviate post-attack suffering and damage. In fact, the entire national stockpile of strategic and critical materials is virtually useless without the facilities needed to convert the minerals and other raw materials in the stockpiles into usable consumer and producer goods.

There is encouragement in the fact that many government agencies - the Office of Civil and Defense Mobilization, the Department of Defense,

the Department of Commerce, the Department of Agriculture, and the General Services Administration - have become increasingly aware since the Korean War of the dangers of nuclear attack and the need to use all possible resources of the nation, including the various stockpiles, to reduce the vulnerability of the nation to such an attack. The Special Stockpile Advisory (Pettibone) Committee provided particular impetus to this awareness, as far as stockpile practices are concerned, in its report issued two years ago. Reevaluations of the stockpiling programs within the last two years have increasingly taken the post-attack needs of the nation into account.

The evidence remains strong, however, that, as a nation, we have little more than started to stockpile the items which would prove essential should a nuclear attack be made on our cities. Aside from food and limited medical supplies and equipment, there is not even general agreement as to what items are most in need of being stockpiled, how stockpiles should be stored and distributed, and how they should be administered. Planning in this area requires a high priority if we are to have any hope of confronting a post-attack situation in such a way as to sustain the American people and bring about a rapid recovery of the economic potential upon which the nation's survival may depend. Once determinations have been made as to critical stockpile goals needed for post-attack survival and rehabilitation, it should be possible to integrate present stockpiles into a more realistic program and to provide for and manage whatever further stockpiles the threat of nuclear attack may require.

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Appendix IV.—Library of Congress Study of War Damage Insurance

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LEGISLATIVE REFERENCE SERVICE

WAR DAMAGE INSURANCE IN A NUCLEAR AGE

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November 6, 1959

WAR DAMAGE INSURANCE IN A NUCLEAR AGE

The Setting for War Damage Insurance

In the area of national security, planning within the Federal Government, and to some extent elsewhere, can be said necessarily to focus on three basic problems: (1) the prevention of war; (2) the successful prosecution of war if war is not prevented; and (3) the post-war readjustments of the nation. These are of course not mutually exclusive areas. The diplomatic negotiations with the Soviets and others undertaken in the efforts to secure peace must of necessity take into account the effect of any concessions or other agreements on the ability of the United States to resort to military action of varying degrees of intensity. Planning for military action involves considerations of protection of the people and land of the United States, and of the effect of military involvement on the post-war recovery of the nation. Nevertheless for purposes of exposition, this tri-partite division of areas of planning is useful.

It is understandable that the first of the basic planning problems mentioned above, the prevention of war, receives the widest and most detailed attention. This is of course the immediate problem faced by the statesmen and citizens of the world, the problem most directly confronting them. Again it is understandable that the problems of a post-war world are considered with far less frequency and with less urgency. This lack of pre-occupation with the problems of a post-attack world is due to a number of reasons in addition to the obvious one of greater distance in time from the present than the immediate problems of

maintaining peace and preparing for military actions. On the one hand, there is a considerable degree of resignation, or a sense of futility, in caring about the state of the world, including the United States, after an attack with nuclear weapons. To many people, this would be Armaggedon in a most literal sense. These people make the assumption, explicitly or implicitly, that the areas of destruction would be so vast, and lethal or near-lethal intensity of radiation would be so prolonged, that any thought of survival is futile. In general they believe that whatever energies reside in a society should be devoted to preventing this fate from overtaking us. Others, not quite so pessimistic as to the chances of survival of life on a worthwhile plane, believe that the present state of ignorance and confusion as to the amount and kind of damage to expect in a war where nuclear, biological and other weapons may be used, likewise makes planning for a post-attack world a futile intellectual exercise.

There is another group of people, numerically not very large at present, who take a more optimistic, or some would say a more realistic, attitude towards a post-attack America. These people make the case that a great deal can be done to cut down substantially in the losses which a potential enemy would be able to inflict, and further that other actions can be taken before such an attack which would greatly facilitate the rehabilitation of the nation's economy, making possible resumption of life along patterns recognizably similar to those now being followed. These people have advocated a considerable range of

activities designed to minimize the impact of an enemy nuclear attack, including shelter construction, stockpiling of strategic materials, strengthening the legal and institutional structure of our society, and research and development of the various important aspects of non-military defense.

One institutional proposal which has been considered by a few students of the problem of preparing for a post-attack situation is the establishment of some form of war damage insurance or compensation. This report is limited to a consideration of this particular phase of post-attack planning.

It will not consider, except in a limited way, the related subjects of insurance of ships and cargoes in war zones, life insurance where enemy action is the cause of death, or reinsurance of carriers of workmen's compensation insurance where injury or death due to enemy action is suffered while on the job.

Historical Precedents

Many of the belligerent nations during World War II had some form of war damage insurance. In the case of the United States and Great Britain the program was not put into effect until after the war had begun. In the United States no action was taken until December 13, 1941, when the Reconstruction Finance Corporation, at the request of the President, established the War Insurance Corporation. No policies were issued and no premiums were charged or collected. Subsequently, in March 1942, the RFC Act was amended to establish the War Damage Corporation

as successor to the War Insurance Corporation. The War Damage Corporation was to provide protection for real and personal property, and was established as a policy-writing and premium-collecting type of organization. It collected approximately $260 million in payments for $114 billions worth of insurance. A single atomic bomb could of course cause property damage equal to 5 or 10 times the $260 million collected in premiums during World War II. Following the war, the War Damage Corporation was placed in liquidation.

In Great Britain a form of compulsory insurance was adopted with deficits financed by the government. As the plan finally worked out premiums paid about 20 percent and the government 80 percent of the damage claims arising from World War II. In France and Germany indemnity laws provided for compensation for war damage. No government insurance involving payment of premiums was in effect.

There is widespread agreement, however, that the experience of the United States with war damage compensation to date is not likely to be very helpful in a post-nuclear attack situation of the magnitude now envisaged.

Current Government Proposals

The Congress of the United States has not been unmindful of the problem. In the years, 1950-1952, several bills were introduced designed to reactivate the War Damage Corporation of World War II, and to expand its functions. Hearings were held in both Senate and

House on these bills.[1] One of these bills, H. R. 9802, 81st Congress, passed the House, but none of them was enacted into law. H. R. 9802 provided only for insurance of private property, real and personal, damaged as a result of enemy attack, including any action taken by the military, naval, or Air Forces of the United States in resisting enemy attack. Some of the other bills would have added one or more of the following functions: (1) Federal reinsurance for workmen's compensation liability insurance; (2) insurance for injury or death of civil defense workers in the performance of their official duties; (3) insurance coverage for damage to property located in other countries if owned by citizens of the United States.

One bill, S. 1848, 82nd Congress, 1st Session, goes much further than those just referred to. It was introduced, by request, by Senator Frear, after having been submitted as a draft proposal by Mr. Elmer B. Staats, Assistant Director, Bureau of the Budget, at a hearing of the Subcommittee on Securities, Insurance and Banking of the Senate Committee on Banking and Currency on July 11, 1951. S. 1848 was designated as the War Disaster Act of 1951 and covered, in addition to war damage compensation, such topics as restoration and rehabilitation, income maintenance after a nuclear disaster, and payments for war damage to public property.

1/ U. S. Congress. House. Committee on Banking and Currency. Reactivation of war damage insurance. Hearings ... on H. R. 9130, 9312, 9340, 9682, 9738, 9739, 9802, and 9805. December 7-8, 1950. 59 pp.
U. S. Congress. Senate. Committee on Banking and Currency. War damage corporation act of 1950. Hearing ... on H. R. 9802 ..., December 21, 1950.
U. S. Congress. Senate. Committee on Banking and Currency. War damage corporation act of 1951. Hearings ... on S. 114, S. 439, S. 1309, and S. 1848...., April 18-July 11, 1951. 260 p.

As a major proposal already submitted to the Congress, some details of this bill need to be reported. Mr. Staats, in his testimony, indicated that four basic assumptions underlay the reasoning of the Bureau of the Budget in presenting the bill.

His first assumption was "that an enemy attack, if successful, is capable of visiting upon us destruction and devastation such as we have never known before." This assumption is common to all major discussions of this problem at the present time. Amplifying this assumption, Mr. Staats added: "In our judgment it is not sufficient to think solely in terms of the protection of property, and then only on a selective and voluntary basis. Neither is it realistic to protect only certain sources of family income, or to attempt to distinguish between casualties occurring at work or at home." Legislation should be broad enough "to meet the essential human needs which would arise from large-scale destruction, bringing with it vast damage to private and public property and physical, social and economic disruption."

Mr. Staats' second assumption was that "the resources of peacetime insurance and compensation system, designed as they are to protect

against normal risks, cannot meet the overwhelming needs of a population suffering from the impact of today's destructive weapons."

He maintained that any attempt to apply actuarial principles to meet war-damage needs is unrealistic for the following reasons:

(A) If premium rates were held low enough to be attractive, they might not cover losses; in this case the policyholder would either be misled as to the amount of protection he really has or the Government would be forced to contribute substantially to the cost of meeting the liabilities.

(B) If premium rates were set sufficiently high to accumulate a substantial fund they might be prohibitive. Under the circumstances, the only property owners who would take our insurance voluntarily would be those who believed their property to be in critical target areas, in the opinion of the Budget Bureau.

(C) If the Government were to underwrite the potential liabilities of all of the various types of insurance and compensation systems, this would constitute an indefinite and unlimited advance commitment. This would deprive the Government of the freedom of action necessary to meet urgent needs.

(D) Insurance is selective. If the Government contribution were to become the major source of funds for the settlement of claims, it would be extremely difficult, Mr. Staats maintained, to justify not providing compensation to those people who, for whatever reason, had failed to take our insurance. The Government would, therefore, be placed

in the position of operating two systems, one a selective one for the holders of insurance, and the other a general program to meet economic needs not covered by insurance.

(E) There is a wide range of national needs which cannot be met through any type of insurance system. Chief among these are the urgent requirements for immediate interim restoration and rehabilitation of essential services and facilities. These are pressing human and social needs which cannot depend upon, or wait for, a host of individual decisions on claims or payments.

(F) Any war damage legislation, it is assumed, should help to preserve and protect our peacetime systems of compensation and insurance. It can do this best by insulating these systems from the imponderable liabilities of warfare - rather than by making them a vehicle for meeting the demands of severe social and economic dislocation.

The third assumption, Mr. Staats stated, on which the War Damage Corporation Act proposal is made is that the Federal Government, in time of national emergency, cannot avoid responsibilities for meeting the essential needs of the entire population. If the country were attacked, the costs of the necessary measures would be great. Restoration and rehabilitation of property would have to be undertaken in the light of available resources as a nation.

The fourth assumption was that it is not desirable to enact in advance detailed legislation prescribing an organizational blueprint for coping with civilian war damage. Instead the need is for flexible

authority to meet whatever situation may arise. "The Government, therefore, should have stand-by authority adequate for an extreme emergency, yet not cumbersome, costly, or subject to misuse if the attack never comes."

This bill is designed to meet three basic problems: (1) interim restoration and rehabilitation of essential community services and industrial activities; (2) maintenance of income for civilians and the protection of income rights; and (3) compensation for property damage. Passage of legislation along the lines of this bill would give the people of the United States a positive measure of assurance that, in the event of attack, the Federal Government is prepared to assume necessary responsibility in these three fields. For this report, Title III, dealing with compensation for property damage, is particularly relevant.

Title III provides for a program of property indemnification designed to assure owners that, within certain specified limits, the Federal Government intends to compensate for property damaged or destroyed as a result of enemy action. It is designed to strike a balance between a relatively small Federal insurance program or the advance assumption by the Federal Government of an unlimited commitment to compensate for war damage to property.

Specifically, Title III would authorize the creation of a War Damage Administration which would be responsible in the event of enemy attack, for receiving, settling, and paying claims arising from

loss, destruction, or damage to private property in the United States, its Territories and possessions. The payments would not be made until the President had declared that the danger of substantial war-caused damage had abated. Provision for income maintenance, set forth in Title II, and for restoration and rehabilitation of basic production and services, set forth in Title I, would therefore, it appears, receive priority over compensation for property damage.

In preparation for handling claims for property damage resulting from enemy action, the War Damage Administration would carry on limited planning and would take essential steps to provide for the adequate preservation of records on property, including costs, values, and ownership. A War Damage Appeals Board would also be provided, to hear the appeal of any claimant from the settlement determined by the Administrator of the War Damage Administration.

In addition, Title III includes provisions authorizing the President to aid State and local governments in the reconstruction and repair of their properties.

The bill would have authorized appropriations of $20 billion for the indemnification of private owners of property destroyed or damaged by enemy action, and $2 billion for the reconstruction and repair of the property of State and local governments.

While these figures are necessarily arbitrary, the amounts chosen would serve to assure property owners that, in the event of fairly substantial damage, they can expect reasonable compensation, without

involving an unlimited or unmanageable commitment on the part of the Federal Government. The amounts are considerably less than the current annual expenditures for private and public construction and represent perhaps 3 to 4 percent of the total value of all eligible property. If the total damage proved to be substantially greater, but still within manageable fiscal limits in the postwar period, the Congress at that time might decide to increase the authorized total.

The bill would authorize payment of not more than 90 percent of the value of any approved claim for damage to private property. To simplify administration and avoid a multitude of small claims, a "loss deductible" rule of $100 would be applied in all cases. Roughly the system would operate in the following way: All approved claims of private property owners below $5,000 and the first $5,000 of all larger claims - less 10 percent in each case - would be paid first. If the total remaining claims exceed the unused portion of the $20 billion, the payments would be reduced by prorating the remaining funds.

By adopting an indemnity approach to property damage, property owners who suffer loss can be assured of a substantial measure of indemnification, if the total amount of damage is not too great. Such an approach eliminates the problem of establishing premium rates without knowledge of risks involved, the funds necessary to meet liabilities, or the period available to accumulate them.

The private-property indemnity was the only part of the bill for which authority would be vested at the outset in an official other than

the President. This is because the indemnity program requires definite preattack preparations, such as the preservation of property records and the preparation of manuals to guide future property valuations and payments.

The findings of the War Damage Appeal Board would be conclusive and not referrable to any court. This provision was designed to free the courts from what could amount to an overwhelming task and to permit the expeditious handling of many claims whose urgency might be great. Since indemnities would not be a matter of contractual right but would be a grant by the Federal Government, the prohibition on appeals to the courts was held to be appropriate.

This proposal, as incorporated in S. 1848, 82nd Congress, is the most comprehensive proposal put forward thus far in terms of a Congressional bill. There has, however, been a continuing concern on the part of various government agencies with this problem of war damage insurance and compensation. In its semi-annual report issued to the Congress on March 22, 1956, the Office of Defense Mobilization announced that it had started a broad study of the problem of compensation for possible war damage to the United States, designed in particular "as a possible measure to re-establish the credit system following an attack" in order to promote rapid restoration of the nation's economic activity. This study has since been assigned to a Special Committee on Financial Policies for Post-Attack Operations, including representatives of the Office of Civil and Defense Mobilization, the Board of Governors of the

Federal Reserve System, the Bureau of the Budget, the Department of the Treasury, and the Council of Economic Advisers. A subcommittee of this committee has studied the problems of war damage, indemnification and insurance as a part of a more comprehensive program of preparedness for rehabilitating our monetary system and financial institutions following large-scale attack upon the United States. The Special Committee may be expected to issue some of its findings within the next few months. As the present time, tentative conclusions appear to favor a program of limited indemnification, among other measures, and to be opposed to a program of war risk insurance having applicability to the damages resulting from attack.

The Board of Governors of the Federal Reserve System has undertaken a separate study on planning for post-attack financial and economic rehabilitation which deals explicitly with the problem of indemnification.1/

It makes the assumption not only that planning is necessary in order best to prepare for a post-attack situation, but that such planning should "attempt to preserve some continuity with the past." It assumes further "that the continued use of familiar institutions and organizations would provide much the better chance of survival in the first chaotic days

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1/ Its memorandum, "Preattack Planning for Postattack Financial and Economic Rehabilitation", was first issued on March 14, 1957. A revised version was issued on April 16, 1959. The revised version was used in preparing this report.

of greatest danger. Furthermore, those surviving economic units that have controlled property or have had economic power in the past probably could make the greatest contribution to increasing productivity in the rehabilitation and reconstruction period."

This assumption of preserving continuity with the past implies some degree of loss - sharing, that is transfer of property from those who would survive with unimpaired property ownership to those who would survive but would have suffered property losses.

The Federal Reserve study believes that nearly full indemnification in the balance sheet sense is required, if solvency is to be maintained, "because of the closely articulated character of our financial system and the narrow margins of equity on which many institutions rest."

The institution proposed in this Federal Reserve study to provide the mechanics for bank solvency and eventually loss equalization is an Asset Validation and Equalization Corporation.

Asset validation would be the first and foremost function of this agency designed to provide temporary insulation of the money and credit system following an all-out attack. To accomplish this objective the Asset Validation and Equalization Corporation (hereafter referred to as AVEC) would undertake the following steps:

(A) Issue validation bonds in exchange for instruments evidencing debts (secured and unsecured) owing to financial institutions. These exchanges would be made only with financial institutions and only for obligations that were impaired by the attack. Such validation bonds

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could be considered as place-holding devices issued in anticipation of ultimate indemnification.

(B) These validation bonds would date from the attack and would bear a low rate of interest. The maturity of the Validation Bonds should be adjusted to the anticipated fiscal necessities of the reconstruction period. A call provision might be included.

(C) Validation Bonds would be exchanged par-for-par or book value (whichever was the lesser) for all financial assets offered AVEC without regard for the nature of the particular instrument or for the extent of any value impairment resulting from nuclear attack.

(D) Title to all such assets exchanged for Validation Bonds would pass to the AVEC.

(E) Validation Bonds would be transferable only to the extent that they would be used as collateral to secure advances from Federal Reserve Banks. The Federal Reserve presumably would make advances only in cases where additional liquidity was needed for emergency purposes and in a manner consistent with Federal Reserve policies governing other types of advances to banking institutions.

(F) Financial institutions would have the privilege of repurchasing assets previously sold to AVEC by exchanging Validation Bonds for such assets on the original exchange basis with interest adjustment.

(G) If the original owner, after due notice by the AVEC that it intends to sell a financial asset acquired from him, does not exercise his privilege to redeem, AVEC would have authority to sell to another

purchaser such financial assets either for cash or for Validation Bonds.

The more fundamental steps for effecting loss equalization would have to await the end of hostilities and the re-establishment of the effective authority of the Federal Government. These steps are envisaged as follows:

(A) The AVEC would administer the processing of war-damage claims of private individuals or their estates, and of businesses which suffered property losses. These claims would be settled with Equalization Certificates which would bear a low rate of interest and would mature in some period such as ten or twenty years after the end of hostilities.

(B) Since States and local government have ample taxing power, these governmental bodies should not be indemnified as such. AVEC,however, could guarantee the debts of incapacitated States or local governmental units so as to preserve the solvency of institutions and individuals or substitute Validation Bonds for them if that seemed the preferable treatment.

(C) AVEC could act as receiver of corporations too shattered to be rehabilitated. In acting as receiver, AVEC would tend to work as a clearing agency, since on the one had it would act in making claims for liquidating enterprises and would at the same time charge against them the taxes or insurance sums which may be required for financing of the plan.

(D) AVEC would have the primary responsibility for collecting the taxes used to offset or finally pay the Equalization Certificates and

Validation Bonds. For administrative purposes the Treasury Department might be fiscal agent in exercise of the tax function so as to coordinate assessments, receipts, etc. AVEC financing, however, should be kept functionally separate from regular Treasury financing by some device such as a trust account, according to this plan. The taxes for such financing should not be allowed to drift into the regular tax structure.

This study proposed three principal sources of revenue for this indemnification: (1) estate or death tax, (2) the capital gains tax, and (3) a net worth tax. The estate tax would have great revenue potential if the proportion of people killed in an attack were substantial, It could be redesigned so as to take on the characteristics of an inheritance tax. Restricting inheritance to a greater extent than now done would be helpful. The proposed form of a capital gains tax would involve increased rates on capital gains, plus an unrealized capital gains tax, tied together with an option which would have the effect of inducing a considerable concentration of revenue in the period at which it would be needed. The most logical form of taxation would be a levy on the post attack net worth of all individuals and businesses. This however would almost certainly be unconstitutional. In a post-attack crisis, however, a constitutional amendment permitting such a tax is at least conceivable.

Private Proposals

The most complete private proposal for a system of war damage compensation known to us is that made by Herman Kahn of the Rand Corporation and

published in draft form, as a multilithed report, "Appendix III, a War Damage Equalization Corporation", by Herman Kahn, Paul Clark, and Richard Morsteen. Part I of this report sets forth a fairly specific form of a War Damage Equalization Corporation. Part II, by Paul Clark and Richard Moorsteen, considers alternatives to Kahn's proposal.

The basic elements of the plan, as set forth by Mr. Kahn, are the following. The Federal Government would offer to sell insurance to individuals and corporations that would compensate them for losses they might suffer as a result of enemy action. This compensation would be either in terms of dollars numerically equal to the pre-war value of the property (apparently assuming 100 percent coverage of the insured property) or in terms of a variable number of dollars, to compensate for inflation, as set up by a post-war Equalization Commission. Recognizing that any proposed rates for such insurance are essentially arbitrary at this point, Kahn suggests rates of .1%, .3%, or .5% of the value of the property, according to the risk class. He estimates that with reasonable participation, the Government might collect from $1 billion to $5 billion per year. This would appear to assume insurance coverage of property valued at about $1 trillion. For a voluntary program this estimate is likely to be excessive, considering that fact that the total value of all reproducible assets in 1955 was estimated at $1,109 billion.

These rates are reported by Mr. Kahn to be slightly under fire insurance rates on masonry buildings and about a half to a third of those

on frame houses, and are similar to those charged by the government's War Damage Insurance Corporation during World War II.

Mr. Kahn suggests that supplementary features of this insurance plan which might bring in additional revenue could be direct life insurance, reinsurance of current life insurance, and reinsuring workmen's compensation. However none of these, nor the insurance of ships and cargoes in war zones, are considered further in his proposal. Being peripheral to his basic plan, they are also not evaluated further here.

It is proposed, in order to give impetus to the program, that participants during the first two or three years of the operation of the insurance program be given 100 percent coverage immediately, while thereafter full coverage would not be granted until the third year of participation. In the latter cases, it is proposed that one-third coverage be allowed the first year and two-thirds the second.

The income received from premium payments would not be kept in liquid form but would be used for specific civil defense purposes. In fact, according to Mr. Kahn, making such funds quickly available is the primary objective of this insurance proposal. As he says: "The reason why I am interested in the WDEC is less that of doing a service to those who want protection against the risk of war than because of the possibility that this organization may raise money which could be used to finance long-term programs in the passive defense fields." (Italics added). At another point in his report, Kahn states:

"The guiding criterion in setting rates was to maximize revenue and to a lesser extent to minimize problems of public acceptance." (Italics added).

The funds obtained from insurance premiums would be used principally in three ways: (1) "to create and improve a lot of underground space by a subsidized mine program," (2) to encourage designing and construction of industrial shelters useful also for personnel protection, and (3) to stock-pile materials that the government would need if it ever went into a crash program of shelter construction.

The funds collected as premiums having been used for various essential passive defense purposes would, of course, not be available for payment of claims of the insured. Such claims would be paid off by a tax on the remaining wealth of the country. Thus while the insurance would be voluntary, the tax to pay the claims of the insured would be levied on the postwar wealth of all taxpayers.

In their discussion on Kahn's war equalization proposal, R. Moorsteen and P. Clark do not propose specific alternatives to his proposal but do point out the relative merits and disadvantages of financing economic recuperation measures by means of taxation, compulsory insurance, and voluntary insurance. Their preference is for compulsory insurance. They also discuss the different methods which should be applied to financial institutions, business firms, and families in terms of post-war equalization plans. In any case, it would appear that compensation will only be partial, assuming any attack of the dimensions most frequently postulated.

Jack Hirshleifer, also with the Rand Corporation, has also devoted considerable attention to the problems of war damage insurance.[1/] Hirshleifer stresses the beneficial effect which war damage insurance may have as an incentive to property owners to make their property less vulnerable to damage from a nuclear attack. This end can be achieved by providing war damage insurance according to a schedule of differential rates - allowing, e.g. relatively cheap insurance to property located in safe areas, possessing bomb-resistant structures, and built of noninflammable materials; and only relatively expensive insurance to property located in dangerous areas, not of sound construction, and susceptible to fire.

Hirshleifer's proposal may best be summarized in his own words: "War damage insurance, with rate differentiation according to the best estimates available of the risks bearing upon the insured properties, offers a promising method for encouraging private expenditures having the effect of reducing the national vulnerability to bombing, while providing a procedure for compensation of individuals suffering damage from enemy action. It should be mentioned that such a program would not in any way preclude direct Government expenditures or intervention having the effect of promoting a reduction of vulnerability (e.g., subsidizing the relocation of a critical plant or industry, or requiring

1/ See especially, "War damage insurance," in Review of Economics and Statistics, v. 35, May 1953:144-153, and "Compensation for war damage, an economic view" in Columbia Law Review, v. 55, February 1955:180-19[illegible].

personnel shelters for firms receiving defense contracts), which may be highly desirable in their own right." 1/

Hirshleifer's views coincide substantially with the recommendation of the East River Project, undertaken by Associated Universities, Inc. in 1952 under a Signal Service Contract, as follows:

"If a program of war risk insurance is undertaken by the Federal Government, no new structures should be insured unless they conform to urban defense standards, and premium rates on existing and new insurable structures should be graded according to location, with the highest rates set within Vulnerable Urban Districts." 2/

Both Hirshleifer and Kahn are strongly in favor of a voluntary insurance program, but beyond this there are important differences in their approach. Hirshleifer would have sharply differentiated rates based on various factors affecting vulnerability, with the expectation that such variable rates would have a significant effect in leading insurance policy holders to undertake on their own initiative and at their own expense protective measures that would increase the ability of structures on their property to withstand the impact of a nuclear attack and thereby serve to protect the inhabitants of such structures

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1/ Columbia Law Review, v. 55, February 1955:194.

2/ Associated Universities, Inc., New York, N. Y. General Report Part I, Report of the Project East River, October 1952, p. 65.

more effectively. Kahn, on the other hand, favors a more uniform rate structure and places his emphasis on using the funds derived from premium payments for various passive defense measures to be undertaken at government initiative.

Kahn is explicit in stating that no reserve would be accumulated for payment of claims, such claims to be paid out of a post-war tax levy. Hirshleifer is more non-committal on this point. He states that "whether it would be wise to conduct the insurance program without a reserve can only be determined by an exploration of the likely consequences of the several different possible policies." Both recognize the fundamental difference between a private corporation which would in accordance with sound insurance principles be required to build up a reserve fund to meet future liabilities and the Federal Government which can, by its taxing power and ability to create money, call into existence assets to meet its liabilities. Hirshleifer concludes that "in the absence of a reserve, the appropriate procedure to redistribute the remaining national wealth would involve a capital levy....To the extent that a reserve exists, of course, assets will be available for meeting compensation claims without calling on the general credit of the government."

Evaluation of Proposals for War Damage Insurance

The studies referred to thus far appear to be the most specific ones issued since World War II to discuss the problems of war damage

compensation which are relevant to the current situation. They approach the problem from three distinct points of view, voluntary insurance, compulsory insurance, and government compensation without insurance, and form the basis for the evaluation which follows.

Any evaluation of these three approaches to the problem of war damage compensation can be considered from two distinct points of view: their usefulness as a pre-war means of increasing preparedness for a nuclear attack and their usefulness as a post-attack measure to bring about rapid rehabilitation of the nation's economy and restoration, insofar as possible, of the prewar pattern of property rights.

Prewar Aspects of Proposals for War Damage Insurance or Compensation

From the point of view of the usefulness of these insurance and compensation proposals prior to a nuclear attack on the United States, the following questions may be asked:

How effective are they in helping the nation prepare for a nuclear attack?

How effective are they in acting as a deterrent to nuclear attack?

Is one more likely than another to be approved by the Congress and accepted by the people?

The use of a voluntary war damage insurance program as an incentive towards more adequate civil defense preparations is stressed by Hirshleifer and Kahn, although the kind of incentive would differ, as already noted above.

Hirshleifer places his emphasis on the usefulness of differential insurance rates "to encourage voluntary private actions in the direction of

reducing vulnerability to bombing." He proposes that for every possible step in this direction, an appropriately reduced insurance premium would (ideally) be offered. Such steps could include relocation in less vulnerable areas, construction of greater resistance to blast effect, and use of more fire resistant materials.

Making the assumption, for purposes of illustration, of a 10 percent damage level in the country and a 10 percent risk of war occurring in a given year, Hirshleifer would propose an average premium rate of 0.9 percent of value on the average but with rates going up to almost 10 percent for property whose complete destruction was certain in the event of war, and, on the other hand, down to essentially zero for exceptionally safe property.1/

Hirshleifer recognizes that other incentives could also be used to bring about private actions to reduce vulnerability to damage from enemy attack. For example, an appropriately differentiated special "passive defense tax" might be levied, or there could be "differentiated compensation schemes in which the proportion of loss to be redeemed for various types of risks might be announced to property-owners in advance, to encourage them to reduce vulnerability."2/ He dismisses these alternatives,

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1/ In his later article, published in the February 1955 issue of the Columbia Law Review, Hirshleifer makes an estimate of 15% risk of war in a given year, resulting in an average premium of 1.5%, with a maximum of near 15%. This compares with Kahn's hypothetical estimate of a 50 percent damage level in the country, and a 3-1/3 percent risk of war in a given year. Kahn also introduced a factor of a 50 percent chance of loss of utility of a "post-war payoff", taking into account the possibility of repudiation either because of defeat or other events, as well as inflation.

2/ War Damage Insurance, Review of Economics and Statistics, May 1953: 147, footnote 7.

however on grounds of administrative or political impracticality.

His main objection to simple compensation schemes is precisely that these schemes do not provide any incentive for private action to reduce vulnerability and on the contrary may make for greater complacency than would otherwise exist.

As already noted, Kahn places more emphasis than Hirshleifer on war damage insurance as a source of revenue for civil defense funds which are then available for public spending on passive defense projects. He places less emphasis on private initiative for modification of structures, protection of machinery, etc. to reduce vulnerability and more on relocation.

The central question about Hirshleifer's approach, from the prewar point of view, would seem to be how useful his differentiated insurance rates would be in achieving the desired goal of increasing the nation's protection against nuclear attack. A basic problem is of course the determination of the proper gradation from structures "whose complete destruction was certain in the event of war" to those that are "exceptionally safe." The gradations made in ordinary fire and casualty insurance have a fairly substantial background of experience. In this field, experience is virtually non-existent. Not only is the range of damage from a given nuclear explosion conjectural but the possible strategies of an enemy in different types of conflict so broad that it would not seem possible at this point to establish a pattern of widely varying insurance rates that would prove acceptable to the paying public.

We may assume that major metropolitan areas are more vulnerable than sparsely settled rural areas. But it is precisely the heart of these metropolitan areas where the highest value properties are almost always located. It is problematical at best that property owners of this expensive property would be willing or able to pay premium costs, in addition to insurance already carried, for insurance against war damage, at differential rates substantially higher than those properties in less vulnerable areas. Hirshleifer makes the point that "differential insurance rates proportioned to risks do not create any inequity which may exist, they merely reflect it." However as long as insurance is voluntary and as long as in the popular mind the threat of atomic destruction of our cities appears remote, it does not seem likely that property owners in large numbers will buy policies where rates will add appreciably to their outlays, and where the extent of payment on claims would be uncertain, not to mention the effect of a post-war inflation in the value of such payment.

If such insurance were compulsory and also differentiated to reflect risks it might bring about serious economic dislocations. As Elmer Staats, Assistant Director, Bureau of the Budget, stated, in testimony before a subcommittee of the Senate Committee on Banking and Currency, on July 11, 1951,

"If premium rates were set sufficiently high to accumulate a substantial fund they might be prohibitive. Under the circumstances, the only property owners who would take out insurance voluntarily would be

those who believed their property to be in critical target areas. As a result, a burden, that is really a responsibility of the entire Nation, would be concentrated inequitably on part of the population. We would thus face the paradox of urging industry and workers on the one hand to remain in vital defense production areas and on the other of requiring them to pay prohibitive rates for the protection of their plants and homes."[1/]

Kahn also notes: "I have argued that people who have property in target areas should pay higher rates. Since most people live close to their property, it is these same people who are most likely to be killed in a war, and therefore, will not benefit from the existence of any postwar world. On the other hand, the people in non-target areas who pay lower rates are the ones who, on the average, are most likely to survive and therefore to benefit from the preparations that have been made to facilitate occupation. These objections might be more germane if the rates were on order of magnitude more discriminatory than the ones we have suggested. (Kahn's proposed rates were at .1, .3, and .5 percent of value of the property insured compared to Hirshleifer's average of .9 percent with a range from "essentially zero" to "almost 10 percent".) I don't believe that any case can be made, however, at the low level of discrimination suggested." (p. 17).

1/ U. S. Congress. Senate. Committee on Banking and Currency. War Damage Corporation Act of 1951. Hearings ... p. 226.

Kahn argues that a voluntary war damage insurance program may have an appreciable effect toward relocating economic enterprises to areas less vulnerable to nuclear damage and destruction. Both he and Hirshleifer admit that at the outset, it would be the firms and individuals who may already have been contemplating the alternative of moving that would be swayed by the element of a more favorable insurance rate. As Kahn says with respect to his plan:

"The discriminatory rates are low, so low that the direct economic incentive to relocate and protect it probably small. The psychological impact may be much greater ....While the economic impact of the suggested discriminatory rates is not very large, it may be large enough to influence the new location or construction and maybe even the relocation or reconstruction of marginal concerns and activities, marginal in the sense that large costs are not involved so that the firms are easily persuaded to change from risky locations and risky-type construction to less risky locations and construction. It is very hard to estimate even roughly the magnitude of this effect, but it should be large enough to have an appreciable effect in decreasing vulnerability." (p. 4, 12).

Similarly Hirshleifer writes:

"An insurance program like that examined in this paper cannot be expected to have a large <u>immediate</u> effect in reducing vulnerability. Since buildings have little removal value, transfer of industrial facilities and housing from urban areas will take a considerable period of time; only an extreme financial differential could induce what would amount to abandonment of properties in one location while building anew in another.

Nevertheless risk-differentiated insurance would set up a system whereby a steady financial pressure would be brought to bear in favor of measures reducing vulnerability and against measures increasing risks. As a result, over the years a cumulatively desirable effect would be produced. There is a tremendous amount of new and replacement investment every year, decisions on which would be made under the influence of the differential premiums. Furthermore, less extreme measures like fireproofing will be encouraged even where relocation is out of the question, and the former may frequently be the more desirable in view of the dislocation and expense likely to accompany dispersion. Effectiveness, therefore, will be comparatively low in the short-run but, it is hoped, large in the long-run. The greatest benefit of the plan will come about if we are so fortunate as to avoid war for a number of years but not so fortunate as to be assured of a lasting peace. The chief threat to effectiveness is fear on the part of possible policy-holders that they will not be adequately recompensed and, on the other hand, that even those not insured will be compensated."1/

During World War II, war damage insurance rates were differentiated as to type of property but for any given type of property were uniform throughout the country. There would undoubtedly be serious objections raised to making certain areas pay higher rates than other areas even though the former were more vulnerable to strategic bombing.

1/ Hirshleifer, Jack. Compansation for war damage: an economic view. Columbia Law Review, v. 55, Feb. 1955: 193.

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A significant shift in location as a result of differential insurance rates seems unlikely. A great majority of economic activity is necessarily determined by the location of urban centers and the surrounding metropolitan areas. There seems to be no possibility under an economic system based on the profit motive and allowing for freedom of enterprise for a significant movement of major economic activity from the established metropolitans areas - the trend, in fact, appears to be in the opposite direction. While the center of population and of economic activity will undoubtedly continue to shift westward (and in some lines of economic activity southward), this is not a movement away from Eastern urban areas, which with few exceptions continue to grow, but from rural areas to the cities and their surrounding suburbs. There are relatively few manufacturing enterprises, mostly those requiring small amounts of raw materials and a small but skilled labor force, for which the factor of danger of nuclear attack would be a significant motive in determining a new location. Thus far, most relocation of industry has been based almost entirely on current economic advantage. Further, in almost all cases, such moves have met with great resistance from local communities who fear the losses that accrue when an industry moves out.

It is more likely that a move out of the central city to suburbs, including increasingly distant suburbs, will continue and may even be accelerated as a result of greater awareness of dangers of nuclear attack. To what extent this movement will actually be effective in

reducing casualties and in permitting rapid renewal of economic activity after an attack would appear conjectural at this point.

In brief, the forces of economic advantage, tradition, and inertia are likely to be strong enough to prevent more than a small percentage of businesses from moving to take advantage of lower insurance rates, or to get into an area relatively well removed from the danger of nuclear attack.

Mr. Kahn notes that "probably the most clamorous customers for war damage insurance will be financial institutions who have to have it in order to be solvent, at least on paper, if a war occurs." The major banks are of course heavily concentrated in the major centers of population and commerce. There is no reason to expect this trend to change. It is true that many of the largest banks have undertaken major projects of duplicating their records and storing the duplicates in relatively safe areas. This will facilitate rapid rehabilitation of credit facilities of the nation.

However, the major single source of assets in almost all banks is, of course, loans. For these banks then war damage insurance would mean to a major extent loan insurance. If a bank's borrowers proved after an atomic disaster unable to repay or refinance their loans, the banks would be reimbursed at least in pre-war dollars. In view of the disruption of the credit system of the nation which is almost inevitable after the war, it is questionable whether this form of loan insurance should receive the priority that is implied in Kahn's proposal.

It is not within the scope of this report to consider the merits of the various civil defense and related passive defense measures for which substantial funds are needed. However it is pertinent to inquire as to the equity of using a program of voluntary insurance which individuals and corporations would purchase primarily to protect their own property in order to finance civil defense facilities which would of necessity be geared to somewhat different objectives, namely the survival of the largest numbers of persons, the minimization of destruction on a national scale, making possible rapid rehabilitation in case of disaster and serving in the meantime as a deterrent to attack.

In the case of ordinary casualty and fire insurance, the person taking out insurance knows with a high degree of confidence that the insurance company he is dealing with is prepared on short notice to compensate him promptly on any legitimate claim he files with it. Under any of the war damage insurance plans, insurance holders cannot have anything like the same degree of assurance, in view of the highly uncertain nature of any possible attack, the fact that the government would not have funds automatically authorized for the purpose of paying off the claims, and that it would have to resort to some form of taxation after the disaster to pay the claims. Kahn is probably correct in saying that expenditure of funds on passive defense will increase the wealth that survives the war. But this fact alone is no assurance that the wealth will accrue in the first instance to insurance policy holders.

It seems obvious therefore, at least as far as the prewar situation is concerned, that with a voluntary insurance program used to finance civil defense projects the holders of war damage insurance policies are subsidizing such a program. Aside from questions of equity in such an arrangement, there remains the question as to whether an insurance corporation is an effective medium for raising funds of the magnitude required, or whether alternatives means might be preferable. The fact that such insurance is voluntary makes it hard to judge how popular it would be. On the basis of the geographical distribution of war damage insurance policies during World War II, it would appear likely that purchases in the southern and central States would be much lower proportionately than purchases along the Eastern Seaboard and the West Coast. However, there is some question as to the validity of comparison with earlier experience, in view of the complete lack of experience in the United States with nuclear devastation. Precisely in the industrial and strategic areas most likely to be subject to attack, many individuals are likely to feel that the chances of survival of self and kin are so small as to make futile the additional outlays called for by this insurance. Others may question the ability of the government to pay off within a feasible time a sufficient fraction of the value of the destroyed property to make the premium payments worthwhile.

A number of authorities hold that no payments should be made under a postwar insurance or compensation scheme until after the close of

hostilities. The proposed War Disaster Act of 1951, as already noted, provided that payments would not be made until the President had declared that the danger of substantial war-caused damage had abated. Professor David F. Cavers, Associate Dean of the Harvard University Law School, has stated:

"If we are to have any system of compensation for war damage - and we have none now - it should be payable only after the hostilities had ended, except where the wartime reguilding of destroyed or damaged facilities was found to be clearly in the national interest. The great sums that would be payable under any inclusive system of compensation for property damage could not wisely be paid out at a time of critical scarcities in the building industries."[1/]

From the pre-war point of view, compensation without insurance has certain limitations which have already been noted, the most important being the failure to provide an incentive to private individuals to take the initiative in providing themselves, their homes, families, and businesses with more adequate protection against enemy nuclear attack.

There are, however, certain compensating advantages which may be considered. It would be substantial reassurance to the American people if there were a law on the statute books which would indicate that the government were prepared to provide some indemnity to those who suffered damage as a result of enemy action. At the same time the government would have greater flexibility of action if it were not bound by as

1/ Cavers, David F. Legal planning against the risk of atomic war. Columbia Law Review, v. 55, February 1955:140-141.

specific commitments as insurance contracts would call for. It would be freer in handling various kinds of claims in accordance with priorities which the kind and extent of damage would call for, without being hampered by pre-war commitments.

Using an indemnity approach to property damage eliminates the problem of establishing premium rates without knowledge of the risks involved, the funds necessary to meet liabilities, or the period available to accumulate them.

There are of course other incentives which can be offered to encourage private action for better protection against nuclear attack. Some, for example, were suggested in the report by the New York State Special Task Force on Protection from Radioactive Fall-out, submitted to Governor Rockefeller on July 6, 1959. This report advocates legislation requiring the incorporation of certain protective features in all new construction in vulnerable areas and remodeling of existing structures to incorporate such features where possible. The cost of such structural innovations and improvements was to be exempt from state taxes. The report also advocated developing special survival kits and an intensive educational campaign to help people protect themselves against fall-out hazards.

Which of the three ways providing for post-war damage compensation or insurance will prove most acceptable to Congress is impossible to say. Kahn holds that a voluntary insurance program is most likely to win Congressional approval and gives this opinion as one argument in

its favor. This viewpoint may be strengthened by the fact that the war insurance program instituted during World War II was a voluntary one and thereby set a precedent.

On the other hand there is no doubt widespread awareness within the Congress of the radically changed situation which would face the nation after a future attack. Hearings held by the Joint Committee on Atomic Energy at the end of June, 1959 on the subject of the effects of a hypothetical nuclear attack attest to this awareness. Lack of action to date in this area may well be due to the mass of conflicting information and the failure of authorities thus far to submit a realistic program. Once not only the degree of danger has been demonstrated but also a program proposed that is realistic and has the full support of the pertinent military, civil defense, and foreign affairs authorities the Congress may consider the interrelated topics of a stepped up civil defense program and post-war damage insurance or compensation in a different perspective.

Postwar Aspects of Proposals for War Damage Insurance and Compensation

Difficult though it is to estimate the pre-war usefulness or effectiveness of any particular war damage insurance or compensation plan, such difficulties pale into insignificance compared to trying to estimate their post-war significance. There are, as already suggested, many elements which have a crucial bearing on any financial or other reconstruction programs which cannot at this point be forecast. It is assumed that there will be no foreign domination over the

surviving United States government and that the government will continue to be able to exercise its sovereign powers under the Constitution. But, will there be a defeated nation or nations with surviving assets on which the United States can make legitimate claim? Will there be foreign countries to which the United States, having suffered a high degree of damage, can turn to for loans, grants, and other assistance? Can we, in other words, expect under such circumstances a Marshall Plan in reverse? Will there be strengthened or weakened demands for closer economic and political ties with other nations? Answers to all of these questions will appreciably affect the ability of the United States government to fulfill its commitments, implied as well as explicit, under any insurance or compensation program adopted by the Congress.

Outside of any insurance or compensation program, it is to be anticipated that the Federal Government would after an atomic attack provide aid to individuals and firms in a number of ways, probably including: (1) benefit payments to the injured and to surviving dependents of those killed by enemy action; (2) loans, grants or advances to private individuals and/or organizations for restoration and repair of industrial facilities essential to the national defense; (3) providing minimum income maintenance for victims of disaster, when such provision is beyond the capacity of individual, local, or State capacity to provide; and (4) granting the President authority, in case of extensive war damage,

to impose a moratorium on any public or private insurance, retirement, or compensation system to allow all such systems to continue in operation with respect to their normal risks and to preserve the rights and interests of the normal peacetime beneficiaries.

The evaluation of claims after an atomic attack would appear to be subject to unprecedented difficulties. It is assumed that, in general, compensation would be allowed only for owners of property physically damaged as a result of enemy action and not for the often equally severe economic losses that would result from the countless dislocations in markets, credit, and other business relationships, or from inflation. The effect of radiation on the usability of property over various periods of time and therefor on its value would appear, on the basis of publicly available knowledge, to be highly uncertain up to this point.

What priority could be given to the settlement of claims, in terms of manpower, money and materials, compared to the urgent needs for survival of people in stricken areas of the nation and the rehabilitation of the nation's economy? As a number of students of war disaster problems have noted, regardless of the amount of insurance carried by individuals or corporations under a war disaster insurance program, the government would, in the first instance, have to establish priorities for rebuilding and renewed production of basic economic goods and services without being able to take the claims of the insured into account. Only after the basic needs had been taken care of, or, as

the Federal Reserve study proposes, after hostilities had ended, could most insurance claims be evaluated and paid.

The problem of treatment of bases of corporations with widely dispersed stock ownership where a significant proportion of the owner stockholders and their next of kin has perished as a result of enemy action must be faced. If, for example, a corporation with 1,000 stockholders each holding an equal number of shares was insured for $1 million and was destroyed along with 500 stockholders and their next of kin, would the remaining 500 stockholders assume the entire equity in the corporation along with the insurance liability of the government, or would the corporation be entitled to only half of the amount of the insurance? Would the government step in as co-owner of the corporation?

The legal tangles that would occur could be endless, and there would seem to be grave question as to the desirability of using scarce resources of manpower in the immediate post-attack period to attempt by such an insurance scheme to establish a semblance of pre-war property rights.

One of the most difficult problems involved in payment of post-attack claims is that of inflation. There is virtual unanimity of belief that a considerable amount of inflation is inevitable as an aftermath of a massive nuclear attack. However the effect of such an inflation on war damage insurance was not specifically considered in most of the studies of the problem cited. The study by Kahn, however,

did specifically concern itself with this problem. In his memorandum he states (p. 3): This compensation [for losses suffered as a result of enemy action] should "be in terms of either dollars numerically equal to the pre-war value of the property (the way a normal insurance company would pay off), or a variable number of dollars (to compensate for inflation) as set by a post-war Equalization Commission. This Equalization Commission would set a rate of indemnification in accordance with certain equalization principles....In no case, however, should the rate set by the post-war commission be less than the face value of the policy." In another place (p. 5), he states "It should be noted that it would be improper to promise to pay off the insurees, in real terms, 100 cents on each dollar of face value." From Kahn's first statement, it would appear that any adjustment set by the Equalization Commission would be upward, in terms of dollar amounts. But the extent of the adjustment is not specified. In effect his proposal would seem to imply insurance not only against the effects of specific war damage but insurance against postwar inflation as well. It should be recognized that virtually no property insurance now in effect has any provision protecting insurees from the effects of inflation. Such protection would be likely to increase, rather than to lessen, the inescapable economic distortions which an atomic attack would bring about.

The possibility of postwar devaluation of the dollar or other currency reform (such as undertaken with considerable success in West

Germany after World War II) should probably be explored.

Perhaps the most fundamental question raised by war damage insurance proposals is whether their attempt to bring about a pattern of post-war ownership similar to that prevailing before the conflict will help or will hinder recovery from the effects of a major nuclear attack. Mr. Kahn states: "In selling the insurance, the government has automatically obligated itself to pay the equalized losses of even its largest customers. I feel, however, that this restoration of the prewar pattern of property rights is a very good gain, not a loss, and in any case a relatively small additional obligation as compared to the obligation or reimbursing the mass of U. S. citizens, particularly if this obligation is undertaken without any advance preparation." (Italics added).

Similarly, although in a somewhat different context, the Federal Reserve System study states:

"The argument for striving to preserve continuity with the past so far as is possible is that the continued use of familiar institutions and organizations would provide much the better chance of survival in the first chaotic days of greatest danger. Furthermore, those surviving economic units that have controlled property or have had economic power in the past probably could make the greatest contribution to increasing productivity in the rehabilitation and reconstruction period. Finally, if new institutional arrangements should prove desirable, the preservation of existing arrangements in the immediate post-attack period would provide an opportunity for an orderly transition."

The relative merits of this approach and of the converse, of wiping out old claims and dissolving old contractual relations, which would involve creating a new money system, needs further examination.

There is both the question as to whether, after an attack of the magnitude postulated for an all-out nuclear attack, the government could and whether it should place a high priority on reestablishment of prewar property rights. In the first instance, its necessary preoccupation with matters of survival and rehabilitation would seem to prevent its concern with any thought of bringing about a semblance of the property status quo ante for a long time. It is even conceivable that concern with attempting to reestablish a prewar pattern of property rights would retard rather than accelerate reconstruction. If, for example, the government felt obligated to hold in reserve certain resources in order to pay off its insurance obligations, uninsured or underinsured portions of the population which might be in a position to contribute more substantially to recovery might be left without necessary assistance.

The question of reestablishment of prewar property rights involves a great many ethical and political factors which go beyond the scope of this paper. The important criterion, it may be argued, is whether or not this objective will contribute towards or detract from the reestablishment of a viable economy. This needs further examination.

Conclusion

The impact of a nuclear attack on the United States cannot be other than subject to the highest degree of uncertainty, speculation and conjecture. Under these circumstances, controversy over the merits and drawbacks of various war damage insurance and compensation proposals is inevitable. Such controversy may also be useful in drawing more attention to this subject, one which is important in any planning for a post-attack world.

Two conclusions are perhaps obvious. First, irrespective of the form finally adopted, some kind of advance preparation and commitment for economic rehabilitation of the nation following a possible nuclear attack is essential. It is essential for the American people to be aware that measures can be taken to assure the survival of the basic values we cherish despite a nuclear attack. It it essential for the American people to know that such measures have real urgency and that they involve advance preparation and considerable expenditures now. It is essential for potential enemies of the country to be aware that the United States is prepared to rebuild its economy with dispatch despite the damage which they might be in a position to inflict.

Secondly, it will require more intensive study to determine what form of preparation for rehabilitation of our economy - voluntary war damage insurance, compulsory war damage insurance, or indemnification without insurance - is most feasible. As this report has indicated, each of these devices has its merits and its defects. The uncertainties concerning the pattern and extent of an enemy attack, the

degree of damage inflicted, the response of the American people, and the post-attack relationships of the United States with the rest of the world, make it difficult to formulate a program with any assurance of success after a nuclear attack. Nevertheless, utilizing the skills of specialists in the fields of finance, insurance, psychology, nuclear physics, and government, a workable program should be formulated as expeditiously as possible.

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THE USNRDL EXPERIMENTAL SHELTER
(A Non-Technical Summary)

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by

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INTRODUCTION

The USNRDL experimental shelter is a buried flexible-steel-arch structure, 25 feet wide by 48 feet long, similar to that used by the Navy as an ammunition storage magazine, that is furnished and equipped to maintain the life and basic health of 100 people for a period of approximately 14 days. It is designed to provide protection against air blast, mass fires, initial radiation and radioactive fallout from nuclear attack. It is provided with facilities for sleeping, eating, sanitation, and recreation, and with stored supplies of food, drinking water, and materials for personal and shelter cleanliness. To maintain a habitable environment, a mechanical ventilation system, together with an auxiliary power unit for use in event of normal power failure, is provided. Radio-communications equipment is installed as well as equipment needed to determine the radiological and damage conditions outside the shelter without the necessity of leaving the safety of the shelter. A cutaway view of the shelter is shown in Fig. 1.

An operating guide has been prepared that provides all necessary information for the operation of shelter equipment and for the organization of shelterees so as to minimize the discomforts of shelter living.

The experimental shelter is located at Camp Parks, near Pleasanton, California, approximately 40 miles from the Laboratory. Its location permits a wide range of experiments to be performed, including those involving the use of radioisotopes.

The experimental shelter has been constructed under the sponsorship of the Office of Civil and Defense Mobilization.

PROTECTION

The flexible-steel-arch structure used in the USNRDL experimental shelter has been tested at a number of weapons tests to determine its resistance to the explosive forces of

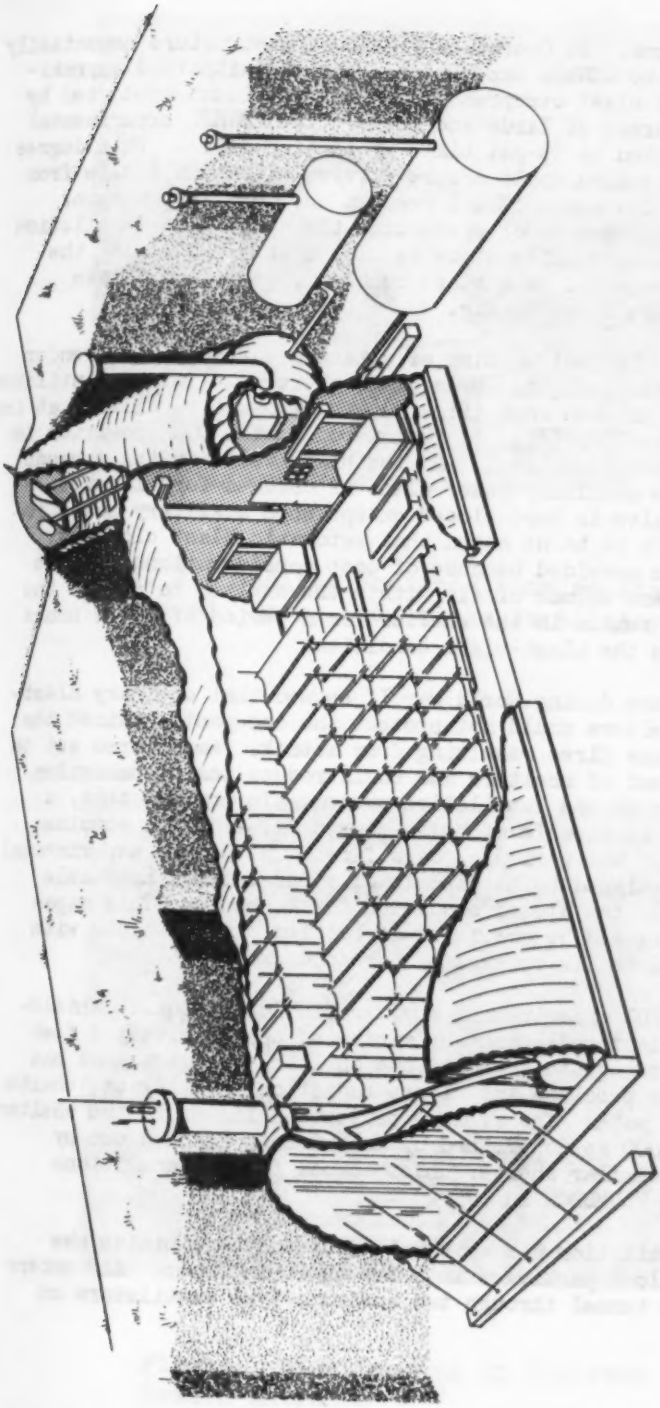

Fig. 1 Cutaway View of Shelter

nuclear weapons. At Operation PLUMBBOB, a structure essentially the same as the USNRDL experimental shelter withstood approximately 50-psi blast overpressure in an experiment conducted by the Navy's Bureau of Yards and Docks. The USNRDL experimental shelter is rated at 35-psi blast protection level. This degree of blast protection would assure survival at about 1 mile from the surface detonation of a 1 megaton thermonuclear weapon. To achieve this degree of protection the access and ventilation openings must be capable of being closed and must resist the stated overpressure. The blast bulkhead, door, and intake ventilators are shown in Fig. 2.

Several minutes' warning of attack are required to render the shelter blast-tight. Upon a RED alert, the intake ventilators are manually cranked shut (Fig. 3), the exhaust ventilator at the rear of the shelter (Fig. 5) is lowered to the DOWN position to provide a blast-tight seal, and the blast valve in the exhaust stack for the auxiliary power plant is checked for closure. (The blast valve is kept closed except when auxiliary power is required.) It is to be noted that automatic blast closures have not been provided because of cost considerations. There is a sufficient volume of air within the shelter to permit the occupants to remain in the shelter for a period of 3-1/2 hours when it is in the blast-tight condition.

Experience during World War II showed that ordinary blast-resistant shelters could not protect the occupants against the effects of mass fires resulting from attack. Mass fires act to suck oxygen out of shelters and to introduce toxic combustion products through the ventilation system. To prevent this, a shelter must be capable of being closed off from the outside atmosphere for the period of mass fire. The USNRDL experimental shelter is designed to be capable of maintaining a habitable environment in the closed condition for 24 hours. This capability is achieved by provision of bottled oxygen, along with Baralyme pellets for removal of carbon dioxide.

The USNRDL experimental shelter provides adequate shielding from nuclear radiations by virtue of approximately 3 feet of earth covering the crown of the shelter. The entrance has a 90° bend to preclude any direct radiation entering the shelter through this path. The average protection factor in the shelter is about 10,000 as determined by experiments carried out by USNRDL in a similar shelter under actual fallout conditions at Operation PLUMBBOB in 1957.

The ventilation air system is designed to minimize the entry of fallout particles into the shelter proper. Air enters the entrance tunnel through two mushroom-type ventilators on

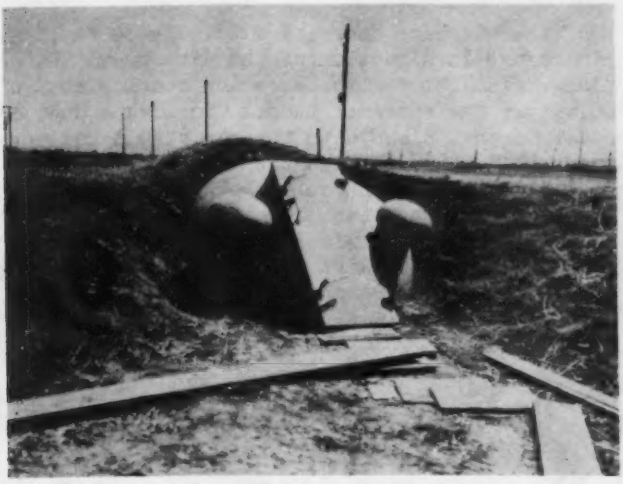

Fig. 2 Shelter Entrance Showing Blast Bulkhead, Door, and Intake Ventilators

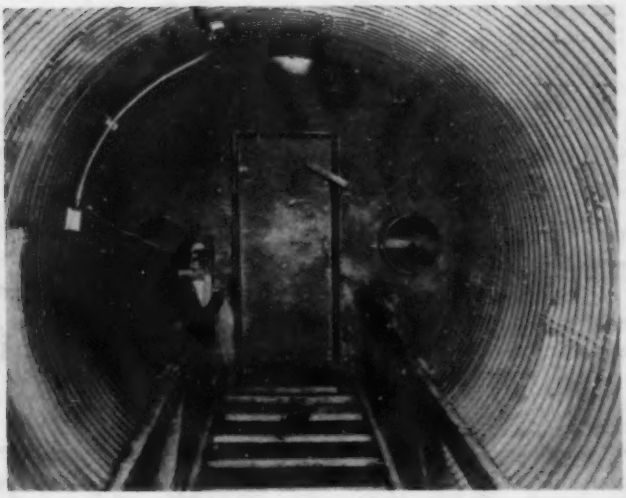

Fig. 3 View Looking up Stairway Toward Entrance

either side of the entrance door (Fig. 2). These ventilators force a rapid change in direction of the air stream that excludes the larger fallout particles, which contain most of the radioactivity. The entrance tunnel provides a duct of large crosssection that slows down the air stream and permits those particles that enter through the intake ventilators to settle and collect in the corrugations of the steel pipe (Fig. 3). At the end of the tunnel near the shelter proper, the air stream enters the ventilation blower through two 24-inch by 24-inch MSA Ultra-Aire particulate filters (Fig. 4).

VENTILATION

Ventilation air is drawn in from the entrance tunnel by an electrically driven blower located on one side of the inner leg of the entrance tunnel. Ventilation air is expelled into the shelter at a rate of 1600 cubic feet per minute through a single air diffuser located over the interior shelter door (Fig. 6). Air is exhausted at the opposite end of the shelter through a 2-foot diameter exhaust ventilator, which also serves as an escape hatch in the event of damage to the normal shelter entrance (Figs. 5 and 7). The performance specification that the ventilation system is proposed to meet is that the effective temperature within the shelter shall not exceed 75 degrees during a 2-week occupancy by 100 persons under adverse (summer) conditions of outside air temperature.

HOTEL FACILITIES

Facilities required for living in the shelter for an extended period are classed as hotel facilities. The USNRDL experimental shelter has a total floor area of 1200 square feet and a gross volume of 11,700 cubic feet. At the rated capacity of 100 persons, each shelteree is provided 12 square feet of floor area and 117 cubic feet of gross air volume. To reduce excessive crowding under these conditions, certain bulky facilities, such as bunks, tables and benches, are demountable and storable so that more of the limited space can be made available.

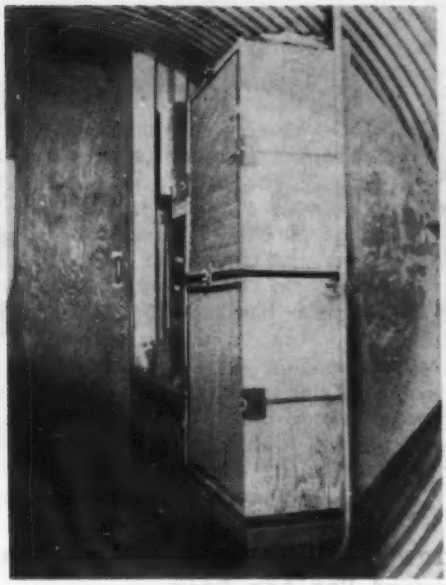

Fig. 4 View of Ventilation Equipment Showing Particulate Filters

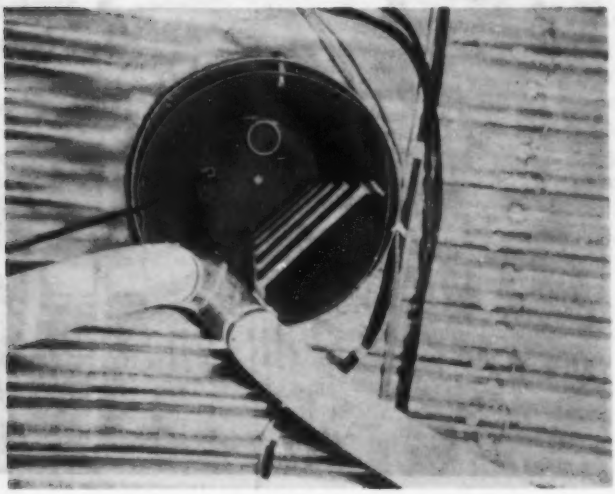

Fig. 5 View Looking up into Exhaust Ventilator

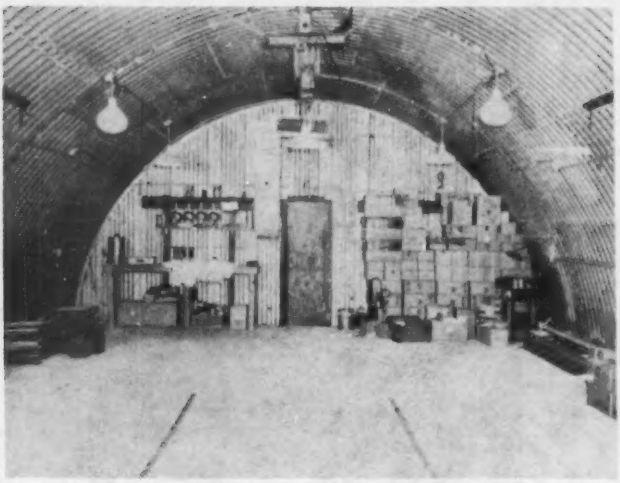

Fig. 6 View Looking from Rear Toward Shelter Door

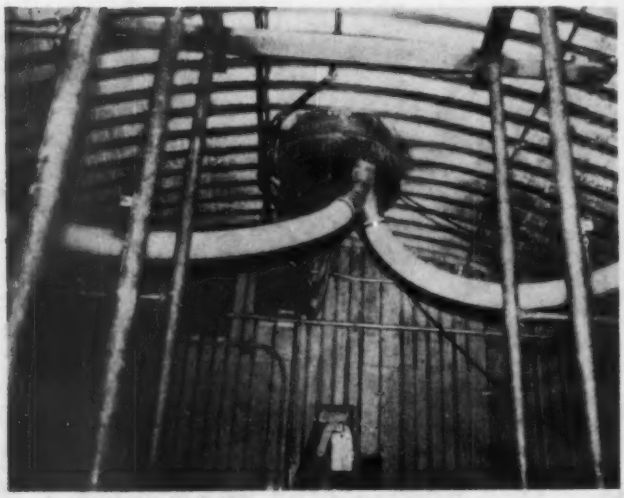

Fig. 7 View of Lower End of Exhaust Ventilator Showing Toilet Vents and Bunk Supports in Place

SLEEPING ARRANGEMENTS

The general arrangement of bunks is shown in Fig. 1. On each side of the centerline, there are 4 tiers of stretcher bunks with 12 bunks to each tier, totalling 96 bunks. It is assumed that a "watch" of at least 4 persons will be routine during sleeping hours. The bunks are 24 inches by 76 inches and they are close-coupled, so that they are entered at their ends by means of a ladder or by using the bunk poles as steps. Each tier of 12 bunks consists of a single strip of fabric with bunk poles attached that can be rolled up (or unrolled) when setting up or taking down the bunks (Fig. 8). The vertical bunk supports can be removed without tools, leaving the area available for other uses. Figure 9 shows the bunks stowed along the shelter walls behind the cartons on each side. Figure 10 shows approximately the same area with the bunks in use during the full-scale occupancy test conducted in December 1959.

EATING AND DRINKING FACILITIES

Five tables and 10 benches are provided that permit meal service in two sittings of 50 persons each. These tables and benches can also be used for recreation (Fig. 11) and can be stored if a clear area is desired (Fig. 6). Food preparation facilities are limited to a simple bench (Figs. 6 and 12), a 2-burner hot plate, a coffee urn, and necessary cooking utensils. Stored food is located as shown in Fig. 6. Drinking water is contained in a 1500-gallon tank buried near the shelter entrance (Fig. 1). This supply provides slightly in excess of 1 gallon of water per person per day for a 2-week period of occupancy. In addition, the water service line extends into the shelter so that the tank can be kept filled as long as the normal water supply remains available.

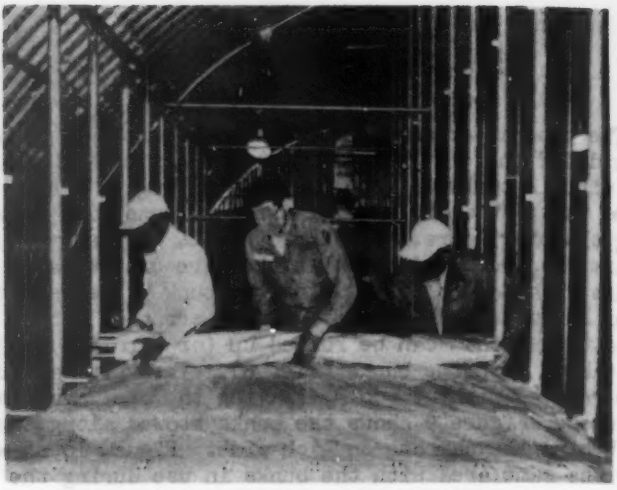

Fig. 8 Bunks Being Installed in Supports

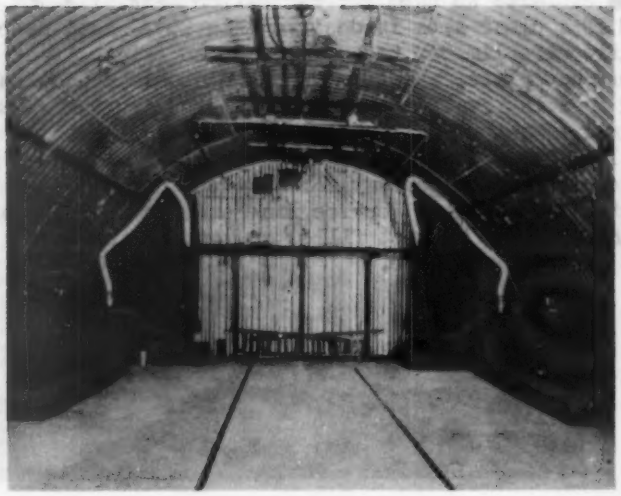

Fig. 9 View Looking Toward Rear of Shelter with Bunks Stored Along Walls

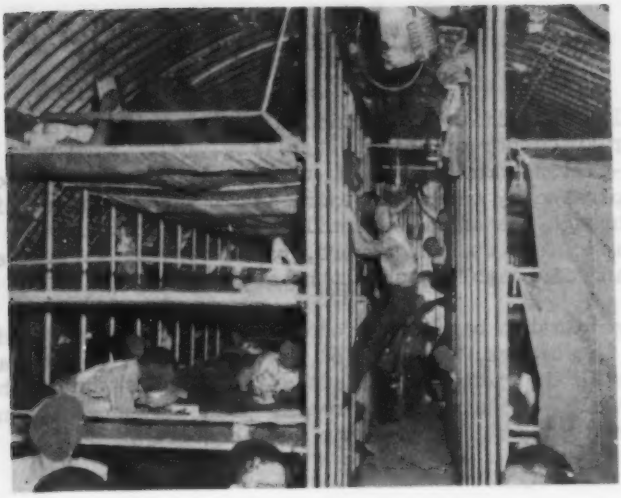

Fig. 10 Bunks in Use

Fig. 11 View of Table Area
During Recreation Period

SANITARY FACILITIES

Toilet facilities are provided by two toilet units, one in each rear corner of the shelter (Fig. 13). Each unit consists of a 415-gallon chemical toilet tank equipped with two toilet seats separated by canvas curtains (Fig. 9). Each tank is vented through the exhaust ventilator by a flexible hose (Fig. 7). Toilet paper, toilet seat covers, paper towels, waterless hand cleaner and disposable wash cloths are provided.

Large plastic bags are used for collecting trash and food refuse. These bags, when filled, are stored in the entrance tunnel until the radiological situation permits them to be placed outside the shelter. Brooms, pails, detergent, and insecticide are provided for cleaning the shelter.

LIGHTING

Lights are concentrated over the table area at the entrance end of the shelter and over the toilet area at the rear. Movable floodlights are also provided to illuminate the bunk area to permit reading in that area. Approximately 1500 watts of lighting are available. Three electrical outlets are located along each wall. A switch panel containing circuit breakers is located next to the entrance door (Fig. 6).

EMERGENCY EQUIPMENT

A minimum of emergency equipment is provided. Basic items are a first-aid kit, flashlights and simple tools for opening jammed doors and for excavation.

Fig. 12 Food Preparation Equipment in Use

Fig. 13 View of One Toilet Unit

COMMUNICATIONS AND CONTROL EQUIPMENT

The USNRDL experimental shelter is fitted with a battery-powered AM radio for monitoring the CONELRAD broadcasts, a minimum-cost low-range radio-telephone for two-way communication with a nearby control center or sector shelter, a periscope, and a radiation-measuring device. All these devices gain access to the exterior through holes in the top of the exhaust ventilator that are fitted with screw plugs for blast protection.

The periscope is an optically simple low-cost device about 3 inches in diameter and 8 feet in length. It is capable of viewing a 40° solid angle. No magnification is provided. Its use will permit the shelter commander to survey the damage and fire situation outside the shelter and to determine the directions of nuclear detonations for transmission to a control center. At a later stage, the periscope has psychological and recreational value for the shelterees by providing relief from the confining view within the shelter.

The radiation-measuring device installed is a so-called dosimeter tube that was successfully tested at Operation PLUMBBOB. This device consists of a 1-inch pipe within which runs a rod carrying a self-reading dosimeter. The dosimeter is charged and read within the shelter, run up to measuring position outside the shelter for a timed interval, then withdrawn into the shelter and read. The difference between the 2 readings can be easily converted to exterior dose rate in roentgens per hour.

AUXILIARY POWER

The auxiliary-power generator unit is located on one side of the inner leg of the entrance tunnel opposite the ventilation blower as shown in Fig. 14. The generator is of 7.5 kw capacity and is driven by an air-cooled gasoline engine. Air for combustion and cooling is drawn from the entrance tunnel and exhausted through ductwork connected to the generator air outlet. The cooling exhaust stack is a 12-inch-diameter corrugated pipe fitted with a butterfly-type valve to provide a blast seal when in the closed position. The generator is equipped with a 3-pole

Fig. 14 7.5 kw Generator in Entrance

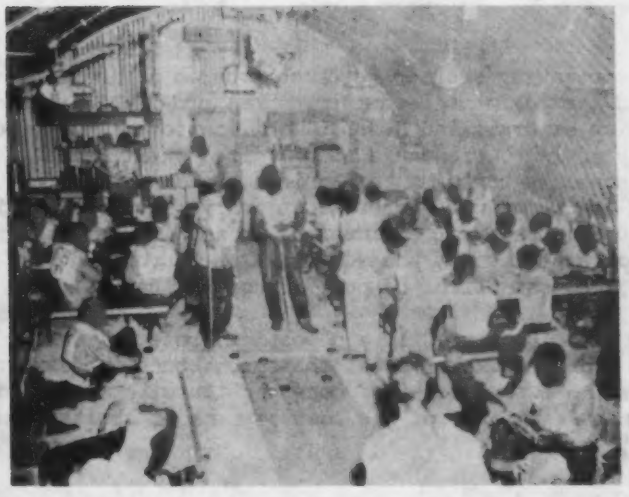

Fig. 15 Looking from Rear of Shelter During Recreation Period

double-throw transfer switch that permits service by commercial power or by the generator unit depending on the position of the switch. It is intended that the generator be shut down during a RED alert. To obtain auxiliary power after attack, the intake valves must be opened, the butterfly closure in the cooling exhaust stack opened, the gas engine started, and the transfer switch thrown to put the load on the generator.

A gasoline storage tank of the capacity required for 14 days of continuous operation (620 gallons) is buried near the entrance tunnel (Fig. 1).

OCCUPIED SHELTER

Figures 15, 16, and 17 are included to give a more adequate impression of the conditions implied by accommodating 100 people in a shelter with a gross floor area of 1200 square feet. The pictures were taken during the full-scale occupancy test of December 1959 in which 100 volunteers remained in the shelter for a period of 14 days.

SHELTER RESEARCH PROGRAM

A continuing shelter research program is in progress using the USNRDL experimental shelter. This program is sponsored by the Office of Civil and Defense Mobilization. The purpose of the program is to produce a standardized shelter design that meets necessary performance requirements at minimum cost. The program is, by nature, interdisciplinary, involving various fields from structural engineering to applied psychology. A series of experimental projects have been proposed that appear necessary to establish the performance of the shelter. They are:

1. Construction and Costing Project. During construction of the experimental shelter, attention was given to establishing actual costs of construction with a view to improving present estimates of the cost of a major shelter construction

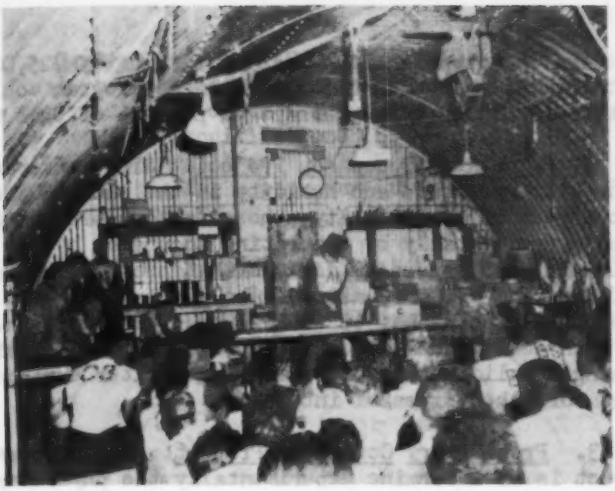

Fig. 16 One of Several Training Lectures During Shelter Stay

Fig. 17 Listening to Record Player in Bunk Areas with Bunks Dismantled

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program. The prototype shelter cost approximately $25,000. It is anticipated that such units in a large program could be constructed and equipped for perhaps 60 percent of this cost.

2. Simulated Occupancy Project. Since environmental conditions of temperature and humidity in the shelter are an important aspect of habitability, these factors are being determined experimentally by simulating occupancy by 100 persons. The people are represented by devices that produce the same amount of heat and moisture as would be given off by the people. Several simulated occupancy tests have been conducted in conjunction with actual human occupancy tests to form a basis for establishing a valid method of predicting shelter environmental conditions for other sites of interest.

3. Preliminary Occupancy Project. The purpose of this project is to determine experimentally the physiological and psychological effects of the shelter environment, facilities, organization, and procedures on selected personnel and to propose such modifications as appear necessary. The first such test occurred in December 1959, in which 100 male volunteers, consisting of 3 investigators from USNRDL and 97 subjects from the Santa Rita Rehabilitation Center, Alameda County, lived for 14 days in the experimental shelter. Other tests are planned after necessary modifications of the shelter are made.

4. Radiation Shielding Project. The purpose of this project is to establish the radiological protection afforded by the USNRDL experimental shelter, with emphasis on the amount of radiation scattered through the entrance and other openings. The experiments will involve the placement of radiation sources at various locations on the ground around the shelter and the taking of appropriate measurements within the shelter.

5. Contaminant Ingress Project. This project deals with the question of whether filtered air is a requirement to prevent fallout particles from entering the shelter. The principal experimental effort will be performed in the USNRDL simulated fallout-dispersing facility at Camp Parks, using a duplicate shelter entrance. Measurements will be made of the passage of airborne particles through each portion of the ventilation system.

6. Fire-Storm Protection Project. A large fire simulating the burning of several city blocks of frame residences will be created over the experimental shelter to test the capability of the shelter to protect occupants under mass-fire conditions.

7. General Occupancy Project. This project represents the final prooftest of the shelter and will be undertaken only after the results of other projects have been evaluated and after any necessary modifications to the shelter have been completed. The experimental work will probably include a full 2-week occupancy test using a representative population of men, women, and children.

8. Engineering and Operational Development Project. This is a continuing project to effect changes in shelter design, equipment, outfitting, and procedures shown to be necessary as a result of progress in the shelter research program.

Appendix VI.—Statements on Radiation Decay Rate

EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF CIVIL AND DEFENSE MOBILIZATION
WASHINGTON 25, D. C.

OFFICE OF THE DIRECTOR

MAY 9 1960

Honorable Chet Holifield
Chairman, Military Operations
Subcommittee
Committee on Government Operations
House of Representatives
Washington 25, D. C.

Dear Mr. Chairman:

I am enclosing a statement prepared by my staff in response to your recent inquiry as to the nature of the radiation decay formulas in use by the Office of Civil and Defense Mobilization.

Sincerely,

Leo A. Hoegh

Enclosure

STATEMENT CONCERNING RADIATION DOSE RATE DECAY EXPRESSIONS IN USE BY OCDM

Knowledge of the rate of decay of radiation from fallout and specifically from what is referred to as local fallout from nuclear weapon detonations is important in civil defense planning. Decay rates are used in estimating future dose rates and accumulated doses. Our studies of various decay rate relationships have indicated considerable differences among them. Some relationships have been based on analysis of samples of fallout material obtained from Nevada and Pacific tests and some have had theoretical foundations. Estimates from experimental observations are subject to variations introduced by such things as differences in location of sample origin, soil in vicinity of detonation, type of device detonated, and weathering. Theoretical estimates of decay laws involve assumptions as to fission yield, half lives and gamma radiation energies for specific products, fractionation affecting certain isotopes, and induced activity. Thus, an absolute determination of the change of the radiation dose rate from fallout with time is difficult and differences among the decay principles advanced by different authorities are to be expected. However, for most nonmilitary defense planning purposes, the existing differences over a period of several weeks are not too significant.

OCDM is collaborating with the Defense Atomic Support Agency of the Department of Defense in the preparation of material for a revision of "The Effects of Nuclear Weapons." Recent information received from DASA indicates that the material relating to amount of fallout deposited and the rate of decay of its radioactivity is being reviewed for this revision. It is understood that the revision will reflect the opinion that in view of the rather large variability in the measured rate of decay of locally deposited fallout debris, even that which is not subject to influences of weathering, attempts to predict the decay of actual fallout fields on the basis of any given decay law or curve are almost certain to be grossly inaccurate.

The revision will probably further state that if prediction must be done, the $t^{-1.2}$ law seems to be as good as any for times up to 100 days after which the U^{235} fission product decay curve may give a closer approximation to the actual decay of weapon debris. These statements would be in line with the present OCDM assumptions, namely that the $t^{-1.2}$ principle may be used as a reasonably good approximation up to approximately 3 months post-attack but that extension of its use to longer periods post-attack will result in predicted dose rates or predicted radiation doses which may be high by as much as an order of magnitude. The total integrated dose to these later periods is relatively unaffected since the major contribution to this dose takes place in the earlier periods post-burst.

For operational use the question of specification of decay rate can be separated from the problem of deposition rate in, for example, kilotons (fission energy equivalent) per square mile. In operational exercises and damage assessment studies, stylized fallout patterns are employed. Those presently in use at the

National Damage Assessment Center were developed by the Physical Vulnerability Division, Director of Targets, Assistant Chief of Staff, Intelligence, Headquarters United States Air Force and published in the "Nuclear Weapons Employment Handbook" - Air Forces Manual 200-8. For exercises, future dose rates and doses are predicted from these patterns using the $t^{-1.2}$ principle.

The Calculational programs of the computer may be modified to permit use of other decay relationships as required. This can be done independently of the input value specified by the fallout pattern for a given location. For emergency operations the value of the dose rate at a given location would be obtained from direct observation using radiation measuring equipment rather than from reference to a stylized pattern. Estimates of future dose rates and doses would be derived from the $t^{-1.2}$ principle as indicated earlier. Repeated observation would be used to determine the actual decay relationship and thus correct the predictions. The requirement for basing emergency operations in a fallout area on monitored data has been stressed in our publications and in our training.

The problem of variation of actual radiation dose rates or doses from those predicted for a flat impermeable uniformly contaminated plane is complicated by lack of precise knowledge in at least two significant areas - surface roughness and weathering. Both effects are presently under active investigation and additional information should be available in the near future. Present estimates of the ground roughness effect for areas such as those surrounding residential structures indicate that the dose rate may be reduced to some 70 to 80 per cent of the flat plane value.

Weathering effects are also highly dependent on the type of surface (paved, grassy, or bare earth), the nature of the soil, and the weather (wind speeds and amount of precipitation). The effects of weathering over a period of several years have been estimated by various authorities to reduce the actual dose rates to 25 to 50 per cent of their flat impermeable plane values. Large differences in rainfall from one region to another could cause a variation from this average range.

Since CCDM does not employ explicitly a value for fallout deposition in KT/mi^2, the values in Table I have been calculated for a dose rate of 2000 r/hr, normalized to H + 1 hour, assumed to have been observed at a given location. This location is assumed to be on a uniformly contaminated flat plane of essentially infinite extent and not subject to weathering. For exposures at early time intervals all significant fallout is assumed to have been deposited before the beginning of the time interval. The tabulated values for radiation dose are for total unshielded exposure dose and do not take into account biological repair or ground roughness. Values for time intervals extending beyond three months have been estimated on the basis of U^{235} fission product decay. The dose rate at five years is estimated to be about 0.5 mr/hr. (Use of $t^{-1.2}$ would give a dose rate at five years of approximately 5 mr/hr.)

TABLE I

Time Interval	Exposure Dose (r)
1 to 6 hours	3000
6 to 12 hours	900
12 to 24 hours	800
2nd day	700
3rd day	350
4th day	250
5th day	170
6th day	140
7th day	100
2nd week	450
3rd week	250
4th week	200
2nd month	350
3rd month	180
4th month	70
5th month	50
6th month	40
7th to 12th month	100
2nd year	25
3rd year	7
4th year	4
5th year	3

DIRECTOR OF DEFENSE RESEARCH AND ENGINEERING
WASHINGTON 25, D. C.

MAY 13 1960

Dear Mr. Chairman:

This is in reply to your letter of April 11, 1960, which mentioned apparent conflict between the so-called $t^{-1.2}$ rule for radiation dose calculations and a table of predicted radiation doses presented by Dr. Ralph E. Lapp at your Subcommittee's recent hearings. I share your interest in, and concern with, the problem of radiation dose prediction in view of its obvious importance to defense planning. As your letter states, a revision of "The Effects of Nuclear Weapons" is being prepared to assure not only clarification, where necessary, but also the inclusion of effects information developed since the last revision.

Calculations have been made which encourage the erroneous impression that the $t^{-1.2}$ rule is a poor approximation to use in the prediction of decay of weapon debris. In actuality, this is not true. The $t^{-1.2}$ rule is sufficiently accurate for almost all prediction problems from less than one hour to approximately 100 days after the shot. It was derived from laboratory experiments, and has since been substantiated by results from field experiments involving nuclear weapon r adioactive debris. For times much less than one hour after a nuclear detonation larger than that resulting from the smallest special (tactical) application devices, fallout decay problems are not of practical concern because the bomb debris has not had time to fall back to earth. The following paragraphs include a more detailed discussion of the prediction problem for times greater than 100 days.

The current edition of "The Effects of Nuclear Weapons" giving $t^{-1.2}$ as "the rule" does not intend that it be used specifically as a design manual or handbook value; rather the discussion is that of a textbook giving the general phenomena and their meaning. The new edition of "The Effects of Nuclear Weapons" will attempt to explain the decay of weapon debris in such fashion that the reader will appreciate the difference between the broad general principles and the specific design criteria which should be used by the design engineer.

The results developed by the U. S. Naval Radiological Defense Laboratory, which, it is understood, formed the basis for Dr. Lapp's testimony, do not represent decay characteristics of weapon debris obtained by field measurements. These results are theoretical decay rates of pure U^{235} slow neutron fission products, using laboratory experiment and theoretical values for the yields, half-lives, gamma energies, and the like, of the individual isotopes produced or believed to be produced. Actual fallout

debris is known to have characteristics different from those resulting from U^{235} fission alone, because of such factors as fractionation, induced activity, and U^{238} fast neutron fission. In addition, environmental factors such as weathering and type of surface are overriding in importance. This is not to say the U. S. Naval Radiological Defense Laboratory results are not interesting and useful. For times greater than 100 days, in fact, it seems wise to use a pure U^{235} or U^{238} fission product curve, as the $t^{-1.2}$ law overestimates dose rate at such long times by as much as a factor of nine. The fraction of total dose contributed after 100 days, however, is very small compared to that contributed at early times.

Your letter posed three specific questions concerning radiation exposure. For your convenience each question is quoted and immediately followed by our answer.

> "Given a hard, flat plane uniformly contaminated with fission products to a level of 1 kiloton (fission energy equivalent) per square mile, what is the theoretical radiation dose rate that one would project from one hour to five years?"

The answer to question 1 is given in the attached graph.

> "What would be the schedule of dosages that a fully exposed person (treated as a point 3 feet above the plane) would receive in the following time periods:
>
> (a) 1 to 6 hours, 6 to 12 hours, 12 to 24 hours;
> (b) second, third, fourth, fifth, sixth and seventh days;
> (c) weekly dosages up to two months;
> (d) monthly dosages up to one year;
> (e) yearly dosages up to 10 years?"

The answer to question 2 is given by the following table.

Dose Received During the Following Time Intervals

Time Interval	Dose in Roentgens
1 - 6 hr.	3,905
6 - 12 hr.	1,045
12 - 24 hr.	1,100
2nd day	825
3rd day	275
4th day	220
5th day	138
6th day	138

Time Interval	Dose in Roentgens
7th day	138
1st week	8,060
2nd week	523
3rd week	311
4th week	245
5th week	149
6th week	107
7th week	91
1st month	9,100
2nd month	468
3rd month	206
4th month	124
5th month	85
6th month	69
7th month	41
8th month	41
9th month	33
10th month	19
11th month	19
12th month	14
1st year	10,230
2nd year	44
3rd year	11
4th year	8.3
5th year	6.9
6th year	5.2
7th year	5.0
8th year	5.2
9th year	4.7
10th year	4.4

What is not fully appreciated is that the dose rate above a hypothetical smooth plane produced by one kiloton of radioactive debris distributed over one square mile is merely a factor used to establish the reference point for the decay curve. In any real situation, one would measure the fallout field in order to establish the actual value at that time and then, using that measured value as the reference point, predict decay from the measured value rather than from some theoretical or calculated value. Furthermore, after a few days or weeks, it is extremely conjectural to attempt prediction of dose rates because rain, snow, wind, and other weathering effects will in almost all conceivable cases alter the decay rate, usually to below the predicted values.

> "How would the normal processes of weathering, as applied to a community in New England, alter the decay rate and dosage data?"

Question 3 of your letter cannot be answered quantitatively, as you will appreciate, because we do not possess such highly specialized weapons effects

information from our atomic test program. We do know that normal weathering (rain, snow, wind) will usually reduce the dose rate levels produced by the radioactive debris below the experimental and theoretical values which we have obtained from our weapons effects research and test programs. On the other hand, some of the radioactive debris may be concentrated in stream beds and on shores downhill or downstream and could conceivably produce dose rates above the predicted values. One cannot answer your third question directly without an actual test in terrain and in a climate similar to that found in New England. It is our belief that on the average the dose rate levels would be less, due to weathering, than we would predict using the available recognized prediction methods.

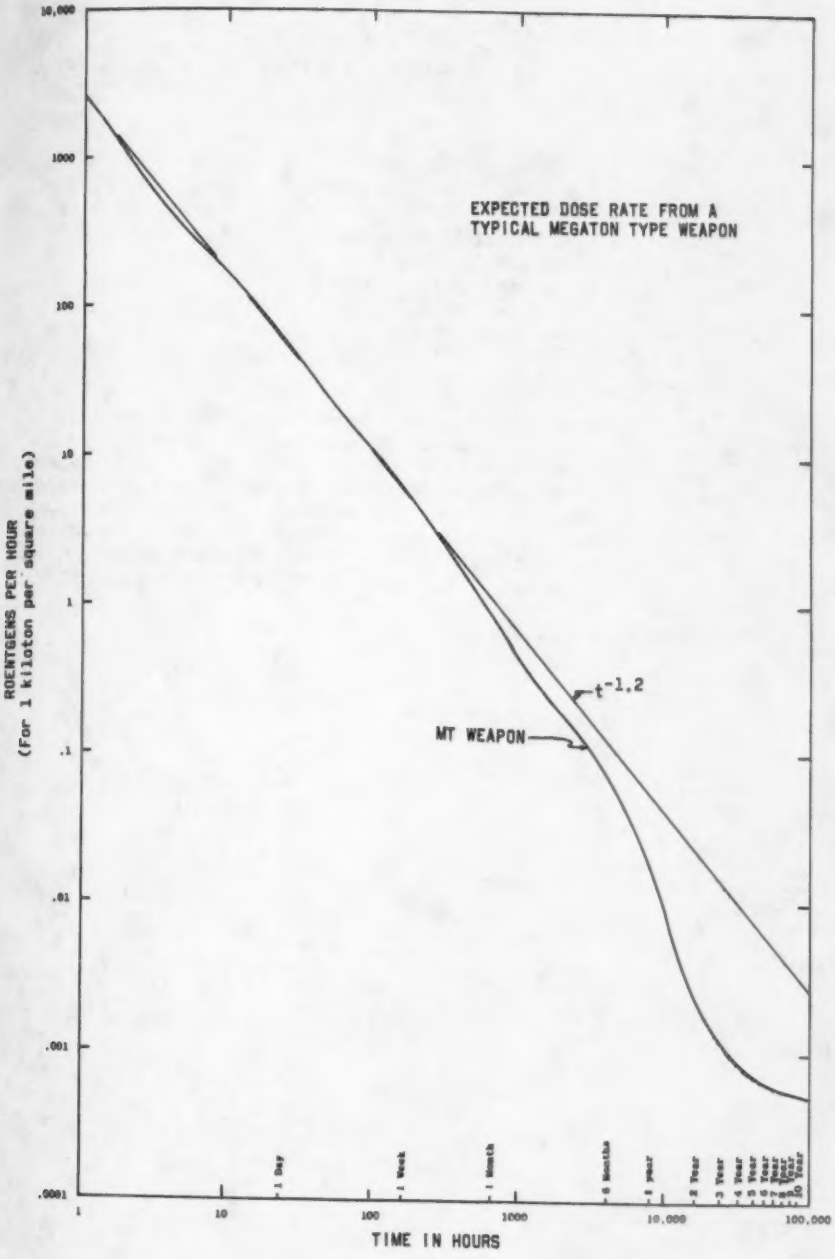
Very sincerely yours,

Herbert F. York

Attachment (1)

Honorable Chet Holifield
Chairman, Military Operations Subcommittee
House of Representatives
Washington 25, D. C.

ROENTGENS PER HOUR
(For 1 kiloton per square mile)


EXPECTED DOSE RATE FROM A
TYPICAL MEGATON TYPE WEAPON
ROENTGENS PER HOUR
(For 1 kiloton per square mile)
10,000
1000
100
10
1
.1
.01
.001
.0001
$t^{-1.2}$
MT WEAPON
1 Day
1 Week
1 Month
6 Months
1 Year
2 Year
3 Year
4 Year
5 Year
10 Year
20 Year
1
10
100
1000
10,000
100,000
TIME IN HOURS

UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON 25, D. C.

JUN 1 1960

Honorable Chet Holifield, Chairman
Military Operations Subcommittee
Committee on Government Operations
House of Representatives
Congress of the United States

Dear Mr. Holifield:

In response to your request of April 11, 1960, concerning external gamma decay rates and dose schedules from the residual radiation of nuclear explosions, and in accordance with our letter of April 28, 1960, the Fallout Studies Branch of the Division of Biology and Medicine has prepared a report entitled "External Gamma Doses and Dose Rates from the Fallout from Nuclear Explosions." The specific answers to the questions raised in your April 11 letter are to be found on pages 27-29.

Three copies of the report are enclosed.

Sincerely yours,

G. E. Seaborg

General Manager

Enclosures:
3 copies of report

EXTERNAL GAMMA DOSES AND DOSE RATES FROM THE FALLOUT FROM NUCLEAR EXPLOSIONS

Fallout Studies Branch
Division of Biology and Medicine
U. S. Atomic Energy Commission

May 16, 1960

Introduction

This report has been prepared in response to a letter dated April 11, 1960, to Chairman John A. McCone of the Atomic Energy Commission from Representative Chet Holifield, Chairman of the Military Operations Subcommittee of the House Committee on Government Operations. Chairman Holifield's letter, in which are posed a number of questions on radiation doses resulting from nuclear detonations, is attached as Enclosure 1 to this report. The answer to these questions are found at the end of this report.

To evaluate the hazards presented by radioactive fallout from nuclear weapons tests or from nuclear weapons used in warfare, it is necessary to be able to state a schedule of external gamma doses and dose rates associated with a given level of fallout contamination. It now appears that there is no single dose schedule which is satisfactory for all purposes. For situations in which induced activities contribute significantly to the fallout dose rate, or in which the fission products are fractionated--that is, are present in different relative concentrations in the local fallout than in the total debris--the concentration of fallout radioactivity in a given area cannot even be simply described as some multiple of the concentration which would exist if all the fission products generated in the release of 1 kiloton of fission energy were deposited uniformly over an area of 1 square mile.

Mr. Holifield's questions were posed in relation to a fission product contamination level of 1 kiloton per square mile. The discussion which follows considers both this method of designating the contamination level, and others which may be more appropriate for particular problems.

It should be noted that the civil defense worker must base his actions primarily on the dose and dose rate readings of whatever instrument he possesses, and upon his expectation of future doses and dose rates. His use of any simple rule for predicting future dose rates from measured values--for example, that a decrease by a factor of 10 in the dose rate will occur for every seven fold increase in the time interval following detonation--requires that the following conditions be satisfied:

(1) at the time of measurement, all the fallout which will eventually be deposited at that location has already been deposited,

(2) that the time of the detonation from which the fallout occurred is known,

(3) that the fallout is derived from a single detonation (or from several detonations occurring at identical times),

(4) that the radioactive debris which produces a given dose rate at a given time conform to certain standard assumptions concerning the relative amounts of the many radioactivities present.

Since all such factors would be subject to wide variations, no one should be surprised to find that the measured gamma dose rate 7 hours following a known explosion might be 10 times greater than that observed at 1 hour following the explosion, rather than 10 times less. It is more reasonable to expect that dose rate measurements made at the end of one day would enable projections for a week hence. For such purposes, tables or graphs of dose rates and accumulated doses are generally more useful than a $t^{-1.2}$ formula, both for predicting future rates based on measured values, and for theoretical evaluations of the fallout consequences of nuclear attack. Since there is no particular simplicity to a table or graph based on a $t^{-1.2}$ law over one based on more complete physical or mathematical considerations, there is no compelling practical advantage in retaining a strict $t^{-1.2}$ decay schedule even for those periods of time when it represents a reasonable approximation to the best information available.

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For many such studies involving local fallout it is sufficient to know the schedule by which the dose rates and accumulated doses vary with time starting with some arbitrary level of dose rate--such as 1000 roentgens per hour at 1 hour following detonation. In these cases it is not necessary or useful to indicate what contamination level is involved in terms, say, of kilotons of fission products per square mile. However, if one wishes to estimate both the local and worldwide external gamma doses due to fallout, or if one wishes to estimate the average contamination level over the U. S. which would result from an attack involving some specific total fission yield, or if one wishes to compute the external gamma dose which would correspond to some particular strontium-90 deposition level from debris of known age, then it is necessary to be able to relate doses and dose rates directly to the fraction of the radioactivity produced during the nuclear explosion which is deposited per unit area. At this point however, one is interested not only in the relative rate of decay, but equally in the initial dose rate corresponding to a given contamination level. It is in connection with both the decay rate and the initial dose rate at 1 hour following detonation that the latest information differs from that given in the 1957 version of the Effects of Nuclear Weapons. These differences and currently available information on fallout doses and dose rates are described in the following paragraphs. It has not yet been determined what information will be included in the forthcoming new edition of the Effects of Nuclear Weapons, or how it may differ from the material presented here.

The Designation of Contamination Levels and their Applicability to the Evaluation of Various Fallout Situations

One method of describing the potential radiation exposures corresponding to a particular level of fallout contamination is to state the roentgens doses and dose rates which would result if the radioactivity generated per kiloton of total yield were uniformly deposited over a flat land surface of area one square mile. This level of contamination is about one half the maximum level found over extensive areas following a high yield surface explosion. For a land surface burst of a 10 Megaton weapon under certain generalized assumptions regarding winds, it might cover 500 square miles and extend 60 miles downwind from the place of detonation. For higher or lower levels of contamination, the schedules of doses and dose rates can be taken as the appropriate multiple of the doses and dose rates for the indicated unit level.

The doses and dose rates corresponding to a contamination level of 1 kt total yield/mile^2 will depend on many factors--e.g. on the fraction of the total yield due to fission, on whether the element undergoing fission is U-238, U-235, or Pu-239, on the energy spectrum of the neutrons causing fission, (a variable of bomb design) and on the quantities of non-fission radioactivities induced in weapon and earth materials.

One need only realize that the fission yield in a nuclear weapon may range from less than 5% up to 100% of the total energy yield to appreciate the great range of variations in the quantity and character of the radioactivity created per kiloton of total yield. Further, an analysis of airborne weapons debris from nuclear tests, together with theoretical

considerations, indicates variations by more than a factor of 50 in the infinity dose due to any of the individual induced activities produced per kiloton of total yield, and by a factor of about 5 in the infinity dose of all the induced activities taken together, depending on the design of the weapon and the chemical composition of the surface over which it is burst. Considering both induced and fission products, the infinity dose for a normal thermonuclear weapon may vary by a factor of 2 or 3 for a contamination level of 1 kiloton of total yield per square mile, or some multiple thereof. The attainable precision of any schedule of dose rates must be judged in the light of this fact when applying it to the estimated doses from fallout in an assumed nuclear war.

Since the contributions of fission products to the total gamma dose rate generally exceeds that from the induced activities for most times of military interest after the explosion of a normal nuclear weapon, it has become customary to designate contamination levels in terms of kilotons equivalent of fission yield per square mile, and either to ignore the contributions of the induced activities or to introduce them as a correction. If the phenomenon of fractionation must be taken into account--as is the case for the fission products from a land surface burst--it is further necessary to apply one set of dose and dose rate schedules to the local fallout, and another to the tropospheric and stratospheric fallout for the same contamination level expressed either in kt of fission yield or kt of total yield per square mile.

Summary of Current Information on Dose and Dose Rate Schedules.

According to The Effects of Nuclear Weapons, the dose rate 3 feet above the ground resulting from the uniform deposition over an area of 1 square mile of the fission products produced in the release of 1 kiloton of fission energy is given by

$$r(t) = 1260\ t^{-1.2} \text{ roentgens/hour},$$

where t is the time in hours. This effect is stated to hold from several minutes to 2 or 3 years. According to this rule the dose rate at 1 hour following detonation for a contamination level of 1 kiloton per square mile is 1260 roentgens per hour. This is the familiar $t^{-1.2}$ rule referred to in Mr. Holifield's letter.

Past studies by the Naval Radiological Defense Laboratory (USNRDL-TR-187, USNRDL-TR-247) of the gamma dose rate associated with the unfractionated products of thermal (slow) neutron fission of U-235 indicate a dose rate which differs from this rule, both in its initial rate of 3630 roentgens per hour at 1 hour, and in the way in which this dose rate changes with time. A comparison of the way the present Effects of Nuclear Weapons doses and dose rates differ from those previously derived by NRDL is shown in Table I (page 8). Table I shows that whereas the NRDL results give a dose rate between 1.6 and 2.9 times greater than those of the Effects of Nuclear Weapons for times between 1 hour and 6 months, they are less than 1/5th as great for times between 2 and 5 years. The origins and significance of these differences were reported in AEC testimony prepared for the JCAE 1959 Hearings on nuclear tests and nuclear warfare.
(page 1969 Vol. 3, Nuclear Test Hearings, and page 113 of Nuclear Warfare Hearings).

Major P. J. Dolan, formerly of the Analysis Division of the Defense Atomic Support Agency, has examined the available experimental and theoretical information and developed a theoretical schedule of dose rates which apply to the fission products and those associated activities induced in the U-238 contained in atomic and thermonuclear weapons (U-237, Np-239, Np-240). His results apply to the local fallout for the first year after fission. He took into account the differences between the fission products derived from the various fissionable materials contained in weapons (U-235, Pu-239, U-238), the actual energy spectrum of the neutrons causing fission, and the fractionation of fission products--the latter by omiting the contributions of krypton and xenon isotopes. His con-

Table I

COMPARISON OF GAMMA DOSE RATES AND INTEGRATED DOSES FOR UNIFORM CONTAMINATION LEVEL OF 1 KILOTON OF FISSION PRODUCTS PER SQUARE MILE

Time After Detonation	Dose Rate (r/hr 3 feet Above Infinite Plane)			Integrated Dose from 1 Hour (roentgens)	
	Effects of Nuclear Weapons	NRDL-TR-247	Ratio NRDL/ENW	Effects of Nuclear Weapons	NRDL-TR-247
1 hour	1260	3630	2.9	0	0
2 hours	548	1530	2.8	815	2375
6 hours	147	342	2.3	1898	5082
12 hours	64	153	2.4	2467	6426
24 hours	28	59	2.1	2964	7573
48 hours	12.1	21.6	1.8	3407	8427
3 days	7.43	12.4	1.7	3629	8816
1 week	2.70	4.92	1.8	4042	9537
2 weeks	1.17	2.39	2.0	4333	10,106
1 month	.483	.973	2.0	4612	10,690
2 months	.204	.356	1.7	4826	11,121
3 months	.126	.212	1.7	4939	11,319
6 months	.0547	.086	1.6	5122	11,610
1 year	.0238	.0148	.62	5273	11,784
2 years	.0104	.0020	.19	5399	11,829
3 years	.00637	.00117	.18	5475	11,842
5 years	3.45×10^{-3}	6.74×10^{-4}	.20	5557	11,857
10 years	1.50×10^{-3}	5.2×10^{-4}	.35	5657	11,882
20 years	6.52×10^{-4}	4.25×10^{-4}	.65	5735	11,923
30 years	4.01×10^{-4}	3.52×10^{-4}	.88	5782	11,957
60 years	1.75×10^{-4}	1.97×10^{-4}	1.1	5847	12,027
100 years	9.46×10^{-5}	9.85×10^{-5}	1.0	6080	12,078

clusions are presented in DASA-528, Theoretical Dose Rate Decay Curves for Contamination Resulting from Land Surface Burst Nuclear Weapons, 6 August 1959, Secret, R. D. They have been summarized in unclassified form by Lt. Parker Moreland of DASA. This summary (DASARA-3 938.22), dated 21 April 1960, is attached as Enclosure (2) to this report. A principal conclusion is that between 1 hour and 100 days the relation dose rate from a KT weapon $= 2600\ t^{-1.23}\ \frac{r/hr.}{KT/mi^2}$ is accurate to within $\pm 9\%$ of the theoretical curve, and the corresponding dose rate from a MT weapon $= 2750\ t^{-1.23}\ \frac{r/hr}{KT/mi^2}$ is accurate within 25% of the theoretical curve, where t is measured in hours.

On the whole, these relations are closer to the NRDL results shown in Table I for unfractionated fission products from the thermal fission of U-235 and without uranium induced activities than is the $1260\ t^{-1.2}$ relation from the Effects of Nuclear Weapons.

The DASA results do not take into account the activities induced in earth materials or other weapon materials than U-238. The contributions of the earth-induced materials Na-24 (15 hour half life and Mn-56 (1 hour half life) may be quite significant in actual fallout, depending on the fraction of the total yield due to fission and the chemical and moisture content of the surface upon which the explosion takes place. Further the DASA results do not point to the large variations in the contribution of both induced activities and fission products to actual fallout, nor are they applicable to other than local fallout.

Some of this information not contained in the DASA study is contained in Table 2 which shows the varied contribution to the infinity dose of various induced activities for a normal weapon, and their typical contribution for a clean weapon. In preparing Table 2 it was assumed

that the radioactivity created by one kiloton of total yield was deposited in each case uniformly over an area of 1 square mile, and that the fission products were unfractionated and derived from the thermal neutron fission of U-235. (Major Dolan found that the differences in the gamma dose rates between fission products from U-235 and U-238 were not very great). These results are based on a paper by H. A. Knapp of this Branch entitled Contribution of Induced Activities to the External Gamma Radiation from Fallout of Clean and Normal Weapons, January, 1960 (Secret RD). The assumption of no fission product fractionation tends to over estimate the doses and dose rates in local fallout, and underestimate them in global fallout.

TABLE 2

ILLISTRATIVE CHART SHOWING APPROXIMATE CONTRIBUTIONS OF INDUCED ACTIVITIES AND UNFRACTIONATED FISSION PRODUCTS TO THE INFINITY DOSE OF FALLOUT FROM AIR AND SURFACE BURSTS OF A NORMAL WEAPON FOR A CONTAMINATION LEVEL OF 1 KT TOTAL YIELD/MI² TOGETHER WITH AN ESTIMATE OF THE INFINITY DOSES FROM FISSION PRODUCTS AND INDUCED ACTIVITIES IN A SURFACE BURST CLEAN WEAPON

Activity	Half Life	Average Mev/Disintegration	Infinity Dose in Roentgens						
			Normal Weapon Surface Burst			Normal Weapon Air Burst			Clean Weapon Surface Burst
			Low	Typical	High	Low	Typical	High	Typical
U-240	14.2 hrs.	.34	10	60	300	10	60	300	
Na-24	15 hrs.	4.1	50	250	600	1	5	10	
Np-239	2.33 days	.27	40	250	900	40	250	900	
U-237	6.75 days	.16	35	150	350	35	150	350	
Fe-59	45.1 days	1.1	0	1	2	0	1	2	
Co-58	72 days	.97	1	2	20	1	2	20	
Co-57	270 days	.13	0	1	10	0	1	10	
Mn-54	300 days	.84	1	3	30	1	3	30	
Co-60	5.3 yrs.	2.5	3	20	30	3	10	30	
Mn-56	2.6 hrs.	1.8	15	100	600	0	0	0	
Total Induced				837			482		500
Fission Products				6000			6000		600

Note: Normal weapon assumed 50% fission yield
Clean weapon assumed 5% fission yield
No fractionation assumed

There are two additional complicating features to the information presented in the previous paragraphs, and it is not clear at the moment how they will be resolved. First, according to the information developed by Kermit Larson and associates, (ref. 4), gamma doses calculated on the basis of Plumbob gamma decay data are 1.5 to 2 times greater than they would be based on the measured dose rates at time of arrival and the $t^{-1.2}$ relationship. This is opposite to the effect one would expect based on the NRDL decay results shown in Table 1, if one were to normalize both the NRDL and the ENW 1 hour dose rates to the same initial rate. Larson's findings on this point are reproduced in Enclosure (3).

Second, NRDL (C. F. Miller, J. G. Brough) has made a study (not yet published) of the effect of fractionation on the gamma dose rate associated with a contamination level of 1 kiloton of fission products per square mile in local fallout for a land and for a water surface burst of a megaton weapon. Their description of the local fallout dose rates associated with a 1000 r/hr at 1 hour contamination level are reproduced below as their proposed Table 9.11[illegible] for chapter 9 of the new handbook, together with the associated text.

Note: Normal weapon assumed 50% fission yield
Clean weapon assumed 5% fission yield
No fractionation assumed

Table 9.114

DECAY SCHEMES FOR LAND SURFACE MT BURST AND WATER SURFACE MT BURST COMPARED WITH $t^{-1.2}$ DECAY SCHEME

Time		r/hr (relative)		
t(min)	t(hr)	I(1.2)	I(F)	I(U)
1	0.017	136,100	97,700	91,300
1.5	0.025	81,600	61,600	57,700
2	0.033	59,100	43,900	41,100
4	0.067	25,800	18,900	17,700
6	0.10	15,800	11,800	11,100
10	0.17	8,580	7,000	6,630
15	0.25	5,270	4,520	4,310
20	0.33	3,730	3,320	3,180
40	0.67	1,620	1,590	1,560
60	1.00	1,000	1,000	1,000
	2	436	381	404
	5	145	121	114
	10	63.1	57.4	52.5
	20	27.5	26.5	23.5
	50	9.14	10.2	7.58
	100	3.98	4.48	3.42
	200	1.73	1.63	1.42
	500	0.577	0.468	0.404
	1000	0.251	0.226	0.162
	2000	0.109	0.112	0.0604
	5000	0.0364	0.0337	0.0127
	10000	0.0158	0.00516	0.00248
	20000	0.00690	0.000371	0.000409

I(1.2) $\sim$ -1.2 rule
I(F) $\sim$ land surface burst, fractionated, MT yield range
I(U) $\sim$ water surface burst, unfractionated, MT yield range

9.114. The decay data given in curve I(F) of Fig. 9.8 and Table 9.114 are representative of that expected some distance downwind from a land surface detonation in the MT yield range. The decay data, I(U), also given in Table 9.114 is representative of that from a seawater surface detonation in the MT yield range. Data for $t^{-1.2}$ decay is included for comparison. Although at times less than 12 minutes there is very little fallout on the ground (for bursts in the MT yield range) there is activity in the air and thus for certain applications (such as operation of aircraft) the I(F) and I(U) dose rate curves at early times are useful. If we compare the data with the $t^{-1.2}$ rule we note that: (1)The land surface burst, I(F) is nearer to the $t^{-1.2}$ approximation than is the water surface burst, I(U). (2) In I(U) a rapid negative departure from the $t^{-1.2}$ rule occurs at about 500 hours (3 weeks). (3) In I(F) a rapid negative departure occurs after 5000 hours (30 weeks or 7 months). For calculations involving re-entry into cities, resumption of agricultural operations, decontamination of areas several months after time of burst, and so forth, these I(F) curves should be used. (4) Both I(U) and I(F) predict negligible hazards at around 10,000 hr. The calculations in Table 9.114 are based on the following criteria: (1) For the I(F) data, using 8 Mev neutrons (the mid point of the neutron energy distribution) fissioning U^{238}, there is a calculated dose rate at one hour of 1,480 r/hr per KT per square mile. Because of fractionation losses this value is much lower than the dose rate assuming the original composition of fission products falling on the ground (3600 r/hr). There is some induced activity due to Np^{239}, giving a dose rate of about 144 r/hr per KT per square mile at 1 hour.

The total calculated dose rate at 1 hour is then, 1620 r/hr per KT per square mile. (2) For the I(U) data, thermal U^{235} fission was used,* yielding a dose rate of 3,950 r/hr per KT per square mile at 1 hour (instead of 3600 r/hr for unfractionated U^{238} fission products). In this case, also, 140 r/hr per KT per square mile at 1 hour was added for the induced Np^{239} activity yielding a total of 4090 r/hr per KT per square mile at 1 hour."

A discussion of the significant available information on gamma decay and dose rates must also include the article prepared by Dr. Ralph Lapp which appears on page 181 et seq of the May 1959 issue of the Bulletin of Atomic Scientists, and which also is reprinted in the 1959 hearings on the Biological and Environmental Effects of Nuclear War, starting on page 215. Dr. Lapp concludes that fractionation leads to a 1 hour dose rate of 2000 r/hr/kt fission / mi^2.

* Miller and Loeb, USNRDL-TR-247.

Reduction of External Gamma Dose Rates by Terrain Roughness, Weathering, and Shielding Control of Exposure Time

All the doses and dose rates described in Tables 1 and 2 and enclosure 2 refers to a point 3 feet above a flat, impenetrable surface over which the radioactivity is spread uniformly. Such doses are called infinite plane doses. The dose actually received by people in an area subjected to fallout is considerably reduced from that received by persons continuously exposed to the same surface concentration of fallout at three feet above such a flat, impenetrable surface. The difference is due to

1. partial shielding due to terrain roughness
2. the shielding afforded by the earth as the fallout particles slowly make their way down into the soil (weathering)
3. reduction of exposure rate and/or limitation of exposure time by varying degrees of shelter
4. the degree to which the fallout is removed from frequented areas by decontamination.

The first two factors listed are determined by nature. One would expect variations between locations depending on the nature of the terrain, the physical and chemical composition of the soil, and the amount of rainfall.

The reduction in the gamma dose from fallout by use of shelter and decontamination can introduce greater variation in the gamma dose to various segments of the population than the variations caused by terrain roughness and weathering. Because of the non-linear short term biological response togamma dose — e.g. 150 results at most in 25% radiation sickness and gives no mortalities whereas three times this dose results in 50% lethality — one cannot compute the

number of radiation casualties and mortalities in areas of heavy local fallout by use of an average reduction factor due to partial shielding and/or control of exposure time. It is necessary instead to estimate the fraction of the population to which various dose rate reduction factors apply. This in turn is affected by the extent to which the exposed population is prepared to protect itself against radiological attack, the amount of warning time, the weather at the time of the attack, and the severity of the fallout. Shelter possibilities are particularly dependent upon the characteristics of the dwelling units. In areas where winters are not severe and houses are customarily built without basements, it would be more difficult to achieve fallout protection.

In areas subjected only to global fallout from nuclear attack, the external gamma radiation would give rise only to long-term biological effects (leukemia, bone cancer, life shorting, genetic effects) which may be assumed approximately linear with total accrued dose. With this assumption one can estimate the total incidence of biological response from an average dose.

It will be assumed here that no special protective measures would be taken against the world-wide fallout. This seems reasonable because the potential biological threat to individuals is relatively small, and effective countermeasures so difficult. Decontamination would be difficult and expensive and would have to be repeated inasmuch as the fallout is deposited over a period of many months. It is assumed here that the protection against global fallout will be that afforded by nature due to terrain roughness and weathering, and by the shelter and shielding normally encountered in daily living. In areas of heavy local fallout where more drastic measures are necessary for survival, decontamination and control of exposure times would provide additional protection.

Reduction of Gamma Dose Rates Due to Terrain Roughness

According to Rand Research Memorandum RM-1285-1

"When the radioactive fallout material is deposited on open fields or unpaved ground in parks, lawns, etc; the small scale roughness and the lodging of radioactive particles in cracks results in the absorption of the gamma rays by the soil and a consequent reduction in the dose rate relative to the infinite smooth plane case. As a result of a combination of calculations of the attenuation of an equivalent thickness of soil covering the infinite smooth plane source and experiments (3), (4), it has been estimated that the dose rate in these circumstances would be about 0.78 of the infinite plane dose rate.

"In a similar experiment in rough terrain, traversed by steep sided ravines, with changes in elevation of 18 feet in 300, the corresponding reduction factor averaged 0.60 for TA^{182} gammas. The corresponding figure for Zr^{95} - Nb-95 would be about 0.58.....

"In residential areas where the building density is smaller and the average roof height less, there will be less variation in the dose rate in going from the center of the street to the building line and the corresponding dose rates will be larger fractions of the infinite plane dose rate. However, the great deviations of yards, gardens, etc., from smooth planes will reduce the infinite plane dose rate, due to partial burial of the contaminant and the uneven character of the ground, so that an over-all reduction factor of 0.7 to 0.8 would probably represent a fair estimate for such areas (3)."

The average reduction factor proposed here is .75, i.e., terrain roughness causes the dose rate to be 3/4 of the infinite plane dose for the same concentration of fallout debris.

Weathering

There is only fragmentary data to indicate the degree of protection at various times following the deposition of fallout particles which results from the gradual leaching of radioactive particles into the soil. One would expect this to vary with soil type and rainfall. It would also be reasonable to suppose that the more finely divided global fallout would behave differently from the local fallout.

Some evidence of the effect of weathering may be obtained from measurements of the external gamma dose rate on Rongelap Atoll for a period of two years subsequent to the Castle tests in 1954. A graph on page 3, Reference 2 shows the actual dose rate two years after the tests, and also what the dose rate would have been at the end of two years if the rate at the end of two days were projected two years ahead using the computed gamma decay curve and assuming no weathering. This comparison indicates that during the first two years following detonation, weathering reduced the dose rate to four tenths (0.4) of the value it would have had if there were no weathering. No effect was noticed until the first heavy tropical rains which started about 10 days after the fallout occurred, and by twenty days essentially all of of the weathering in evidence for the first two years appears to have occurred.

Another estimate of the effect of weathering may be made by measuring the extent to which the fallout particles seep down into the soil, and computing from this the resultant shielding effect. Studies of the downward movement of radioactive strontium by passage of water thru the soil for five soil types representing a wide range of soil properties are reported by Miller and Reitemeier in Reference 3. They found that the maximum movement of Sr-89 leached with thirty inches of simulated rainfall (roughly equivalent to the average annual rainfall in the U. S.) was 1.3 inches, and that the maximum movement for 300 inches of simulated rainfall was 4.3 inches. The average depth for leaching thirty inches of water was about 3/4 inch, and for 300 inches of water this average depth increased to about 1 1/2 inches. According to Reitemeier, similar but still unreported experiments with Cs-137 show that this isotope is displaced downwards much more slowly than radioactive strontium. Cs-137 is found at a

depth of only 1/4 inch or less as the result of leaching by 300 inches of water, even in sandy soil. This indicates that Cs-137 would remain in the top 1/4 inch of undisturbed soil for at least 10 years, and perhaps much longer. Reitemeier believes that most fission products would tend to behave like Cs-137 rather than Sr-89 (or Sr-90).

Another indication of the degree of weathering which may be expected is reported by Larson and Neel (Reference 4). They note that

> "In undisturbed areas the radioactive debris from fallout is confined to the surface two inches of the soil profile even after nine years following fallout contamination (Trinity Areas, New Mexico). In agricultural areas under cultivation, the distribution of activity is found down to depths of four to eight inches due to plowing, harrowing, etc. Soil leaching laboratory experiments using the equivalent of 84 inches of water translocated the surface activity only about 0.5 inches into the soil column."

From this data one may estimate that there would be no appreciable weathering effects in temperate climates for perhaps a month, and that for several years thereafter a reduction equivalent to shielding by 1/4 inch of soil would be typical.

One-fourth inch of soil alone would have little effect on gamma radiation from fallout directly beneath the point of measurement. However, 40% of the external gamma dose on an infinite plane comes from distances in excess of 72 feet. When viewed from a point 3 feet above the ground, a 1/4 inch surface thickness at a point 72 feet distant has a shielding thickness of $72/3 \times 1/4 = 6$ inches. Thus even 1/4 inch of seepage can have a considerable shielding effect. From the curve showing the percentage of external gamma radiation reaching a fixed point from within a given radius of the point and data showing the degree of shielding afforded by different

thickness of soil it is possible to compute the fraction of the surface dose received if the fallout were concentrated at various depths below the surface. The result is that for 1/4 inch leaching the dose rate is reduced to 56% of its surface value, for 1/2 inch to 44% of its surface value, for 1 inch to 32% of its surface value. From this and the previous estimate of the rate of descent of fission products into the soil, one may estimate that no appreciable reduction from weathering can be expected for about one month, and that for several years thereafter a reduction factor of two might crudely approximate the protection derived from this source.

The infinite plane dose, reduced by both the terrain roughness factor and the weathering factor, will be called the open field dose.

From the foregoing it would appear that these combined reduction factors can be considered to increase from about 4/3 in the first month to about 2 x 4/3 = 2 2/3 or roughly three after the first month. Dr. R. E. Lapp, in Reference 6, concludes from a plausible interpretation of the rather scanty data available, that by four years, weathering and terrain roughness introduce a protection factor of four.

Reduction Due to Shielding and Control of Exposure

Table 3, taken from Reference 1, is an estimate of the degree of protection provided by various buildings. The dose reduction factor of final interest in connection with shielding and control of exposure involves the combined effect of various degrees of shielding for various fractions of each day. Some illustrations are helpful. Suppose a laborer is subjected five hours each day to the open field dose rate and spends the rest of the time in a building which gives a protection factor of 10. He would receive

Table 3

Reduction Factors for Dose Rates in Various Buildings

Type of Structure	Dimensions			Material Attenuation				Reduction Factor to be Applied to Infinite Plane Dose Rate*
				Roof		Walls		
	Width (ft.)	Length (feet)	Height (feet)	Material	Attenuation Factor	Material	Attenuation Factor	
Industrial								
Single Story Single Bay	33	400	69	Wood (~6'')	0.65	Glass and Sheet Steel	1.0	0.43
Single Story Double Bay	66	400	69	''	0.65	''	1.0	0.35
Single Story Triple Bay	99	400	69	''	0.65	''	1.0	0.32
Multi-Story Two Floors	164	164	33	''	0.65	Brick (~13'')	0.01	0.23
Multi-Story Four Floors	164	164	66	Wood (~1')	0.42	Glass and Steel Frame	1.0	0.22
Dwellings								
Single Floor Single Family	33	33	19	Wood	1.0	Wood	1.0	0.65
Single Floor Single Family	33	33	19	'' (~6'')	0.65	Brick (~19'')	0.001	0.11
Two Story Multi-family	33	33	33	'' (~1')	0.65	''	0.001	0.11
Multi-Story Multi-family	66	328	66	Wood	0.42	Concrete (>19'')	<0.001	0.09
Civic and Commercial								
Civic Multi-floor	131	394	66	Wood (~1')	0.42	Concrete (>19'')	<0.001	0.12
Commercial Shop-Two Floor	33	82	33	Concrete (~3'')	0.42	Brick (~19'')	0.001	0.09
Large Single Story	250	600	20	Glass and Steel Frame	1.0	Thin Wood	1.00	0.49
Large Single Story	250	600	20	Concrete (6'')	0.14	Concrete (1')	0.014	0.056

*The reduction factor for single floor buildings was calculated for a point 1 meter above the center of the floor area. For multi-floor buildings the reduction factor was calculated for the geometric center of the building. As a result these reduction factors should be regarded as referring to the maximum reduction to be expected in the various buildings.

$$(5/24 \times 100\%) + (19/24 \times 10\%) = 28.7\%$$

of the open field dose. An office worker who spent one hour a day commuting to work during which time he received half the open field dose, 8 hours in a building which reduced the dose rate by a factor of 100, and then 15 hours at home with a protection factor of 20 would receive about 6% of the total open field dose. A laborer who spent 12 hours a day in the open, and the rest of the day in typical rural frame buildings which offered a protection factor of 2 would receive 75% of the open field dose. From such considerations one might estimate that most of the population would receive between 5 and 75 percent of the open field dose as the result of more or less normal activity. The average might lie in the range of 15 to 30 percent for the case of global fallout in which it is assumed no specific protective measures would be employed.

Allowing reduction factors of 4/3 for terrain roughness, 1 to 2 for weathering, and 4/3 to 20 for shielding by buildings, the overall reduction factor from the infinite plane dose to the actual individual external gamma dose is seen to range from about 2 to about 50.

It is interesting to note that in the working paper accompanying the Report of the U. N. Scientific Committee on the Effects of Atomic Radiation it is stated that for global fallout

> "The above (infinite plane) dose rate must be corrected by a factor for the effect of weathering and also by a factor for the effect of shielding by buildings and irregularities of the ground in the practical case. For the combined correction, factors between 3 and 21 have been suggested, a factor of 10 will be assumed here."

In an article in Science (vol. 128, Number 3321, 22 August 1958) on Long Term Fallout, Eisenbud and Harley state in a footnote

"The tabulated values are calculated infinity external gamma dose in millirads. The probable exposure to the population, allowing for shielding and weathering, is approximately 10% of this value."

From these considerations, an overall protection factor of 10 for the average population dose would appear to be reasonable and convenient in the case where a rough average is useful (e.g., long-term dose, world-wide fallout), although significant fraction of the population would be expected to be above and below this average.

A study by J. W. Reed of the Sandia Corporation (ref. 7) suggests that a factor of 5 might be a better estimate of the overall average protection factor for a population. As reported in this study, a large number of people in the Nevada area were furnished film badges to document their exposure to fallout from nuclear tests during Operation Plumbob in 1957. In addition, a larger number of badges were mounted at fixed points in and around inhabited places. From studying the badges it was reported

(1) the badges on people on the average received only two thirds of the fallout radiation dose that was received by the out-of-doors mounted film badges;

(2) if the film badges carried by people may be considered representative of the actual radiation dose their bearer received before his badge was picked up, "the effective dose is only about one fifth of the infinite physical dose shown in a fallout prediction or rad safe monitor map plot."[1]

[1] The Sandia report states that "Fallout forecases are generally made in terms of "Estimated Dose" recommended by Dr. Gordon Dunning of DBM/AEC, which is about one-half the infinite physical radiation dose. This factor intended to lump the effects of shielding, biological recovery, non-representative exposure, movements, etc." The writer is not clear as to the meaning of the various terms used in the Sandia report.

(3) "...fixed-point badges record 41 per cent of the 'estimated dose' given on fallout maps or only about 20 per cent of the infinite physical dose which fell on the area. Thus it appears that the combination of weathering, atmospheric attenuation, various local shielding factors, etc., reduce infinite doses to about 30 per cent of the calculated map infinite physical dose".

(4) "About one-sixth of the population in the area will receive less than one-half the average dose, and one-sixth will receive more than twice the average dose".

Estimates of Doses to Persons Caught in Local Fallout

In areas of intense local fallout, the seriousness of the radiation effects may well be determined by the number or fraction of the people receiving a sickness or lethal dose. The average dose, which could be below the lethality threshold, or above the level for 100% lethality may have little practical significance.

Many precautions would be necessary for survival, but it is very difficult to estimate what protective measures would be available and how well they would be used.

A study by the Weapons Systems Evaluation Division, Institute for Defense Analysis of the distribution and effects of fallout from heavy nuclear attack (Reference 5) reports the fraction of the unshielded (infinite plane) dose that might be expected to reach various segments of the population within the first days following an attack for two situations. The first situation (called the Unprepared Case) is intended to represent the behavior and consequent protection which might be obtained by various segments of an unprepared population given only a few hours warning of attack. The second (Prepared) case is intended to represent the degree of protection which might be obtained by various segments of a population given six months alert to prepare and build shelters. The average fraction of the available (infinite plane) dose for both cases is shown below.

UNPREPARED CASE		PREPARED CASE	
Percent of Population	Fraction of Available Dose Received	Percent of Population	Fraction of Available Dose Received
52	.50	13	.50
6	.40	8	.20
7	.29	5	.18
31	.24	26	.15
2	.07	7	.07
2	.017	30	.038
		11	.016
100		100	
Population receives 38% of the available Man-Roentgen dose		Population receives 15% of the available Man-Roentgen dose	

For a situation in which the available dose over the first few days is 1000 r (for example in areas of heavy fallout from a clean weapon), the WSEG results imply[1/] 37% mortality for the unprepared case, and 9% mortality for the prepared case. In areas of severe local fallout from normal weapons, one might expect an infinite plane dose of from 3000 to 5000 roentgens to be delivered during the first week. For 4000 r the WSEG results imply 96% lethality for the unprepared case; and 50% for the prepared case.

1/ for the computations it has been assumed that the 50% lethal dose is 450 r the threshold lethal dose is 250 r, and the 100% lethal dose is 650 r, with the usual S shaped curve representing the intermediate dose-mortality relations.

Answers to Specific Questions Raised by Mr. Holifield

With reference to the foregoing discussion we can now answer the specific questions raised by Mr. Holifield as follows:

Question 1: Given a hard, flat plane uniformly contaminated to a level of 1 kiloton (fission energy equivalent) per square mile, what is the theoretical radiation dose rate that one would project from one hour to five years.

Answer 1: For local fallout the best generalized answer we can give at this time to this question for time periods up to 100 days are those developed by DASA in figures 1 and 2 of Enclosure (2). A new edition of the Effects of Nuclear Weapons handbook is being prepared, but it has not yet been determined how to appropriately modify the information governing doses and dose rates from weapons debris. The present edition contains no discussion of weathering or shielding factors.

For stratospheric and tropospheric fallout, for times between 1 hour and 100 years, and for local fallout for times after 100 days, we would currently recommend using dose rate information developed by NRDL as given in column 3 of Table 1, augmented in some circumstances by the contributions of the induced activities as shown in Table (2). Since the nuclides which are depleted in the local fallout are enriched elsewhere, use of either the NRDL or the DASA data, but especially the latter, could cause an underestimate in computations of world wide external gamma doses. (Such doses also depend upon presently uncertain estimates of the fraction of the debris involved in local fallout.

Question 2: What would be the schedule of dosages that a fully exposed person (treated as a point 3 feet above the plane) would receive in the following time periods:

(a) 1 to 6 hours, 6 to 12 hours, 12 to 24 hours.
(b) second, third, fourth, fifth, sixth, and seventh days
(c) weekly dosages up to two months
(d) monthly dosages up to one year
(e) yearly dosages up to 10 years.

Answer 2: The DASA (Dolan-Moreland) data, which are recommended for local fallout, and the NRDL data, which are recommended for non-local fallout, are shown in the following table with the Effects of Nuclear Weapons data for comparison. We have taken the liberty of combining some of the later periods.

Table 4

Dose Schedules
(roentgens per kt fission/mi^2 at 3 feet above a flat impenetrable surface)

Answer 2	DASA Dolan/Moreland-	USNRDL TR-247	Effects of Nuclear Weapons
1-6 hrs.	3905	5082	1898
6-12 hrs.	1045	1344	569
12-24 hrs.	1100	1147	497
1day - 2days	825	854	443
2days - 3days	275	389	222
3days - 1 week	634	721	413
1week - 2 weeks	523	569	291
2 weeks - 1 month	517	584	279
1 month - 2 months	468	431	214
2 months - 3 months	206	198	113
3 months - 6 months	278	291	183
6 months - 1 year	178	174	151
1 year - 2 years	44	45	126
2 years - 3 years	11	13	76
3 years - 5 years	15	15	82
5 years - 10 years	25	25	100

Question 3: How would the normal process of weathering, as applied to a community in New England, alter the decay rate and dosage data.

Answer 3: Based on our previous discussion we conclude that for a rough first approximation no appreciable reduction due to weathering should be assumed for about 1 month, and that for several years thereafter a factor of two crudely approximates the protection derived from this source. In addition to weathering, we noted that terrain roughness may be estimated to reduce the dose rate to 3/4 of what it would be on a flat, impenetrable surface, to give an overall protection factor which increases from about 4/3 in the first month to about 3 after the first month, and further increases to about 4 by the end of two years. In the absence of any information on how local variations of soil and climate may affect these figures, they may be considered equally applicable to a community in New England or anywhere else.

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Division of Biology and Medicine

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2. USAEC Radioactive Contamination of Certain Areas in the Pacific Ocean from Nuclear Tests. August 1947. Unclassified.

3. U. S. Department of Agriculture. Agricultural Research Service, Research Report No. 300. Rate of Leaching of Radiostrontium through Soils by Simulated Rain and Irrigation Waters. J. R. Miller and R. F. Reitemeier. 26 April 1957.

4. UCLA School of Medicine. Summary Statement of Findings Related to the Testing Program at Nevada Test Site. Kermit Larson and James Neel. 25 April 1959.

5. H. Everett and G. E. Pugh, WSEG. The Distribution and Effects of Fallout in Large Nuclear-Weapon Campaigns, Journal of the Operations Research Society of America. Vol. 7, No. 2. March - April, 1959.

6. R. E. Lapp, "Local Fallout Radioactivity", Bulletin of the Atomic Scientists, vol. XV, No. 5. May, 1959, pp 181-186.

7. Sandia Corporation SCTM 112-59 (51) Comparison of Fallout Doses from Nevada Tests, J. W. Reed, April, 1959.

Enclosure (1)

April 11, 1960

Honorable John A. McCone
Chairman
U. S. Atomic Energy Commission
Washington 25, D. C.

Dear Mr. McCone:

During this Subcommittee's recent hearings concerning civil defense shelters and the civil defense implications of military base hardening, Dr. Ralph E. Lapp presented a table of predicted radiation doses resulting from a given nuclear detonation. This table is in apparent conflict with the so-called $t^{-1.2}$ rule for radiation-dose calculations as set forth in the Effects of Nuclear Weapons handbook.

It is our understanding that modification of the $t^{-1.2}$ rule is being considered in connection with a revision of the handbook and that a new decay curve will be based on data developed by the U. S. Naval Radiological Defense Laboratory. It would be appreciated if you would advise us as to the accuracy of this information and also indicate the formula the Atomic Energy Commission is currently using to predict radiation dose rates that would result from a given nuclear detonation.

It would be helpful if you would furnish answers to these specific questions:

1. Given a hard, flat plane uniformly contaminated with fission products to a level of 1 kiloton (fission energy equivalent) per square mile, what is the theoretical radiation dose rate that one would project from one hour to five years?

2. What would be the schedule of dosages that a fully exposed person (treated as a point 3 feet above the plane) would receive in the following time periods:

   (a) 1 to 6 hours, 6 to 12 hours, 12 to 24 hours;
   (b) second, third, fourth, fifth, sixth and seventh days;
   (c) weekly dosages up to two months;
   (d) monthly dosages up to one year;
   (e) yearly dosages up to 10 years?

Hon. John A. McCone April 11, 1960

3. How would the normal processes of weathering, as applied to a community in New England, alter the decay rate and dosage data?

In the event that precise data are not available we would appreciate receiving whatever working approximations are now being used by the Atomic Energy Commission.

Sincerely yours,

Chet Holifield, Chairman
Military Operations Subcommittee

Enclosure (2)

DASARA-3 938.22 21 April 1960

The Decay of Nuclear Weapon Fallout Debris

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Defense Atomic Support Agency

Washington 25, D. C.

54223 O—60——37

A knowledge of the decay of fallout debris from nuclear bursts plays a crucial role in prediction calculations of fallout patterns, casualty estimates and civil defense planning. Hence it is extremely desirable to obtain the best possible data on the decay to provide good input information for these calculations and estimates.

Unfortunately, it is difficult to obtain a sample of fission products and bomb debris as formed at the time of explosion in order to experimentally measure the decay properties, although this was attempted during Operation GREENHOUSE. It is possible to obtain samples of fallout debris, however, and obtain estimates of decay. The drawback with this scheme is that the properties vary with location in the fallout pattern (due to fractionation and other mechanisms), type of soil at burst point, weather, and the type of weapon.

Another approach is to calculate the decay properties of the debris from the known or theoretically estimated properties of the individual isotopes contained in the debris. It is the results of such calculations which will be discussed here.

Several groups have published data on the decay of the fission products due to thermal fission of U^{235} in recent years. The most extensive and applicable results are given by the workers at the U. S. Naval Radiological Defense Laboratory.[1,2] The values of decay rate vs time given in these publications are rather different from those published in The Effects of Nuclear Weapons[3] (ENW), as was brought out in the 1959 Joint Committee on Atomic Energy hearings.[4,5] The NRDL data show larger H + 1 hour dose rates than those given in the ENW and much smaller dose rates at very long times.

Now it must be noted that the NRDL results do not represent the exact decay characteristics of actual weapon debris, since they are the theoretical decay rates of pure U^{235} fission products only, using experimental and theoretical values for the yields, half-lives, gamma energies, etc., of the individual isotopes produced or believed to be produced. But the actual radioactive fallout debris has characteristics different from that of the fission products due to thermal fission of U^{235} as a result of fractionation of the isotopes, induced activities, non-thermal fission, and U^{238} fissions. In addition there will be "weathering" of the debris after arrival on the ground, and in actuality the debris will be on rough terrain rather than the ideal smooth infinite plane almost universally used to calculate the dose rate due to a given concentration of activity on the ground.

In order to obtain a better approximation to the true fallout debris properties, calculations similar to those used to obtain the U^{235} fission product decay were carried out at DASA[6] which resulted in curves for the dose rate at 3 ft above the surface as a function of time due to:

1. Pure U^{238} fission products
2. U^{235} and U^{238} fission products with fractionation of Kr, Xe and their daughters

3. Fractionated U^{235} and U^{238} plus the induced activities produced in the bomb materials, i.e., U^{237}, U^{239}, Np^{239}, Np^{240}.

The amount of fractionation and induced activities were deduced from experimental data obtained in weapons tests. A final curve was obtained for r/hr per KT/mi^2 vs time from a typical KT range weapon, and a similar curve for a MT range weapon, using fractionated U^{235} plus induced activities for the KT weapon, and fractionated U^{238} plus induced activities for the MT weapon. It was found that the properties of U^{238} fission products are not significantly different from those of U^{235} fission products, the largest differences occurring at late times. Fractionation resulted in a depression of the decay rate at early times but did not affect the decay rate at times greater than 3 months. The induced activities are short lived and their tendency to increase the early time dose rate is overshadowed by the reduction in dose rate at early times as compared to a pure U^{235} or U^{238} dose rate curve. For times greater than ~ 3 months, the curves for KT and MT weapons become identical with those for pure U^{235} and U^{238} fission products, respectively.

The units KT/mi^2 refer to the concentration (or surface density) of radioactivity on the surface at any given point which would exist if the radioactivity due to one kiloton equivalent of fission yield is spread uniformly over a one square mile area. It is directly proportional to the amount of fission product activity per square mile, through the relation 1.45×10^{23} fissions = 1 KT. The fallout debris is, of course, not spread uniformly over any large area, but within a small area, say a circle of radius 50 feet or so, where most of the dose at a point at the center of the circle derives, the surface density of activity can be considered constant and expressed in these units. These units are particularly useful with some of the fallout models in use, which express the dose rate at a given point in terms of the "fraction of the device" (f.o.d.) per square mile on the surface at that point. Thus, if one multiplies the above "f.o.d." by the total yield of a given weapon, the results are expressed in KT/mi^2.

For weapon debris, it is seen from figures 1-3 that the theoretical dose rate is very nearly linear when plotted on logarithmic paper for times up to 100 days. When the points on this curve up to t = 100 days are fitted to a power law by least squares analysis, the following relations are obtained:

$$\text{Dose rate from KT weapon} = 2{,}600\ t^{-1.23}\ \frac{\text{r/hr}}{\text{KT/mi}^2},$$

$$\text{Dose rate from MT weapon} = 2{,}750\ t^{-1.23}\ \frac{\text{r/hr}}{\text{KT/mi}^2},$$

where t is measured in hours. For times up to 100 days the relation for KT weapons is within $\pm$ 9% of the theoretical curve, while the relation for MT weapons is accurate to within $\pm$ 25%.

For times greater than 100 days it is obviously wiser to use the pure U^{235} or U^{238} fission product curve, as the power law approximation greatly overestimates the dose rate at these times, by as much as a factor of nine.

Integration of the dose rate curve for KT weapons, starting at H + 1 hour, yields the integrated dose curves shown in figures 4 and 5. These curves show the dose accumulated from H + 1 hour to any time, t, relative to the H + 1 hour dose rate. Thus, in order to obtain the dose received from H + 1 hour to some time t, the value obtained from figure 4 or 5 must be multiplied by the H + 1 hour dose rate. Values of the dose relative to the H + 1 hour dose rate and the actual dose received for a one KT/mi^2 concentration of activity, for which the H + 1 hour dose rate is 2,750 r/hr, are given for certain time intervals in Table I. The dose relative to the H + 1 hour dose rate, $\dot{D}(H+1)$, is given in column 2, the dose due to one KT/mi^2 in column 3.

These results are probably as valid as one can give theoretically at this time for the decay of fallout debris. Since weathering effects and rough terrain will both act to decrease the dose rate and the slope of the decay curve, the dose rates given here should represent upper limits. The actual dose rate above rough terrain will be on the order of two-thirds the theoretical dose rate above a smooth infinite plane.

Activities induced in the weapon structure and the environment will of course tend to increase the dose rate above the values given in figures 1-3. The amount of this activity and its time behavior depend on the particular weapon and environment and can only be estimated if these factors are known.

Measurements have been made of the dose rates from actual fallout samples for periods up to about 200 days.[7,8] Attempts to fit the observed decay of activity with a power law of the form

$$A = A_1 t^{-k}$$

have required values of k ranging from 0.90 to 2.0. At least some of the variability must be due to variability in yield and type of burst, since the measurements referred to included both MT and KT bursts, and bursts at various heights above the Pacific Proving Ground and Nevada Test Site. At least one barge shot was also reported.

In view of the rather large variability in the measured rate of decay of fallout debris which is not subject to weathering, attempts to predict the decay of actual fallout fields on the basis of any given decay law or curve are almost certain to be grossly inaccurate. If prediction must be done, the $t^{-1.2}$ law seems to be as good as any for times up to 100 days, after which the actual U^{235} decay curve may give a closer approximation to the actual decay.

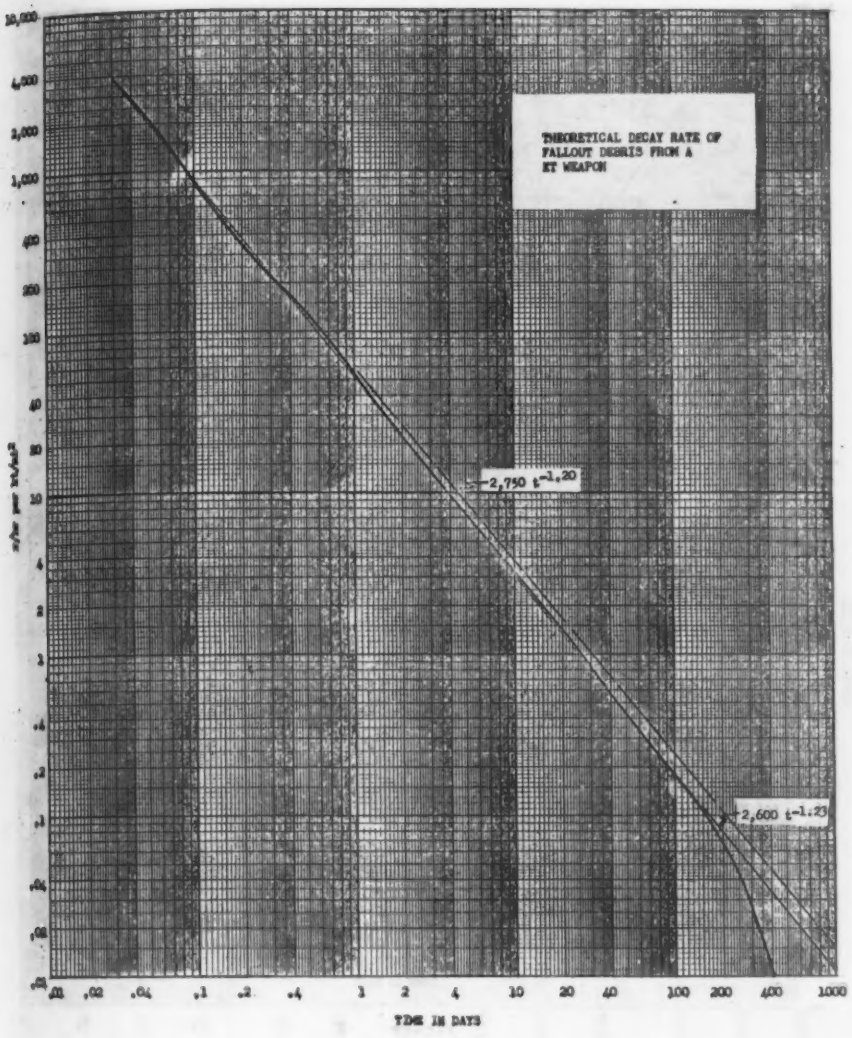
THEORETICAL DECAY RATE OF FALLOUT DEBRIS FROM A MT WEAPON
=2,750 t^-1.20
=2,600 t^-1.23
TIME IN DAYS

Figure 1

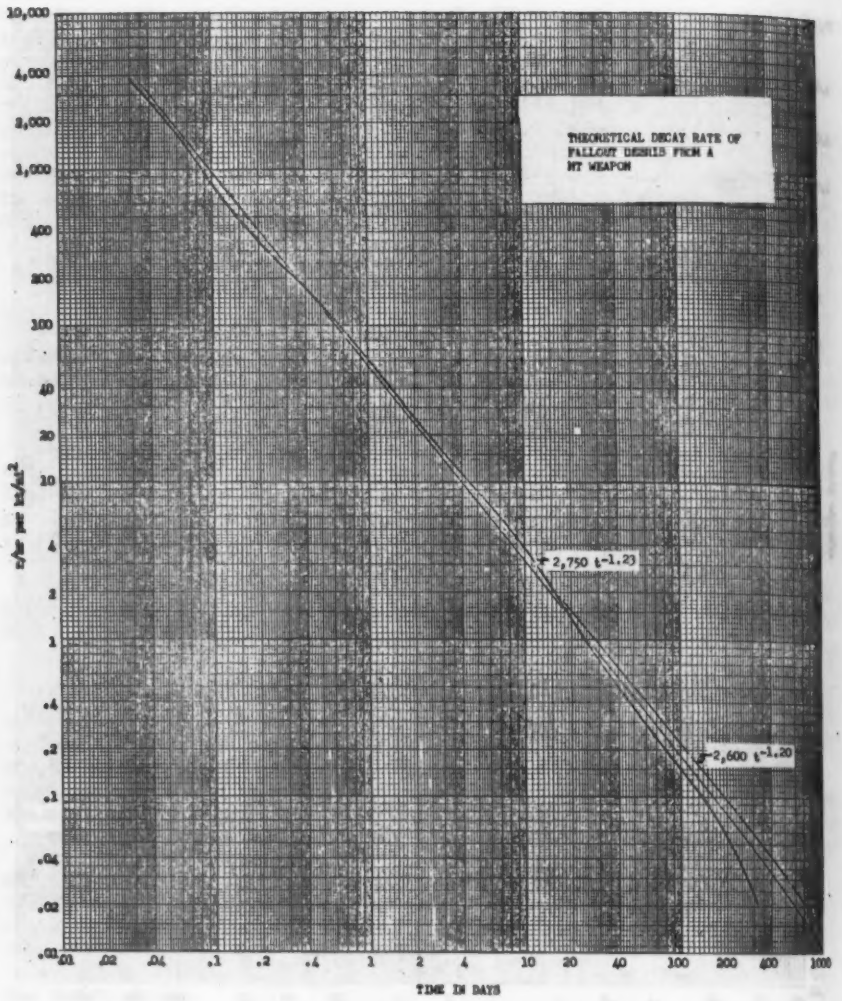
THEORETICAL DECAY RATE OF FALLOUT DEBRIS FROM A MT WEAPON
r/hr per kt/ft²
10,000
4,000
2,000
1,000
400
200
100
40
20
10
4
2
1
.4
.2
.1
.04
.02
.01
+ 2,750 t^-1.23
2,600 t^-1.20
.01 .02 .04 .1 .2 .4 1 2 4 10 20 40 100 200 400 1000
TIME IN DAYS

Figure 2

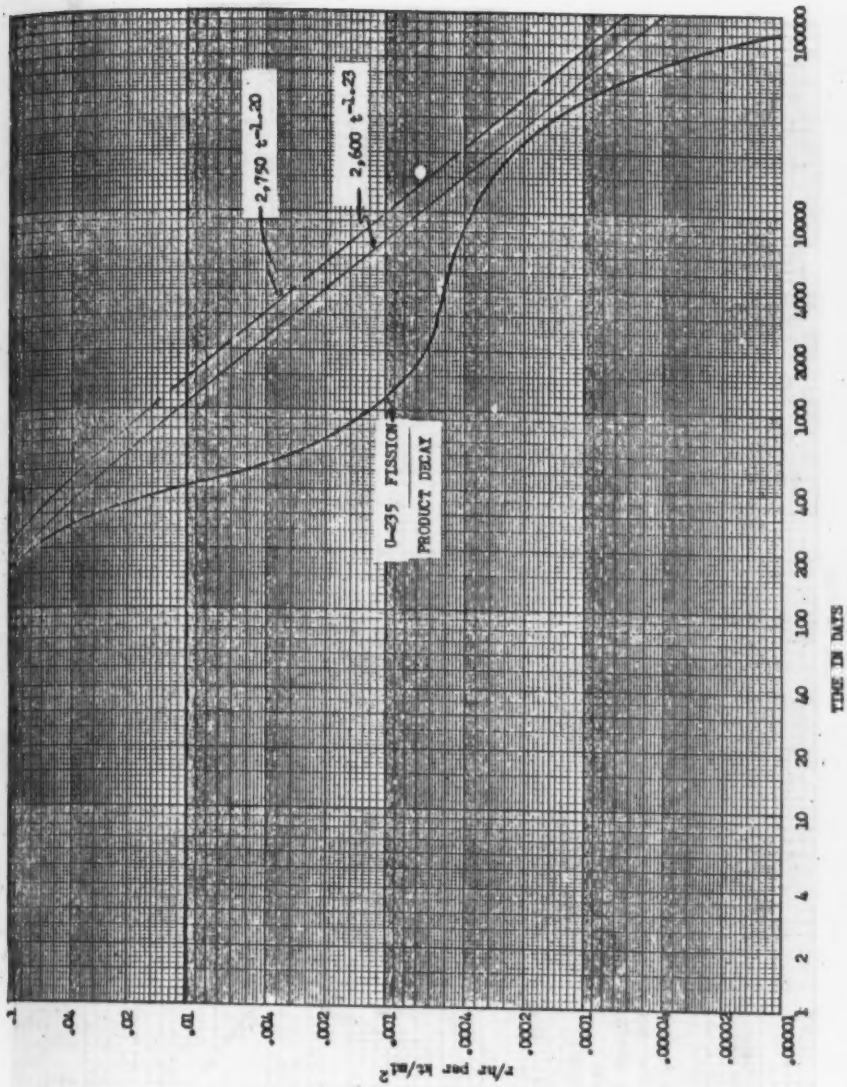
2,750 t^-1.20
2,600 t^-1.23
U-235 FISSION PRODUCT DECAY
r/hr per kc/mi²
TIME IN DAYS
1
2
4
10
20
40
100
200
400
1000
2000
4000
10000
100000
.0001
.0002
.0004
.001
.002
.004
.01
.02
.04
.1

Figure 3

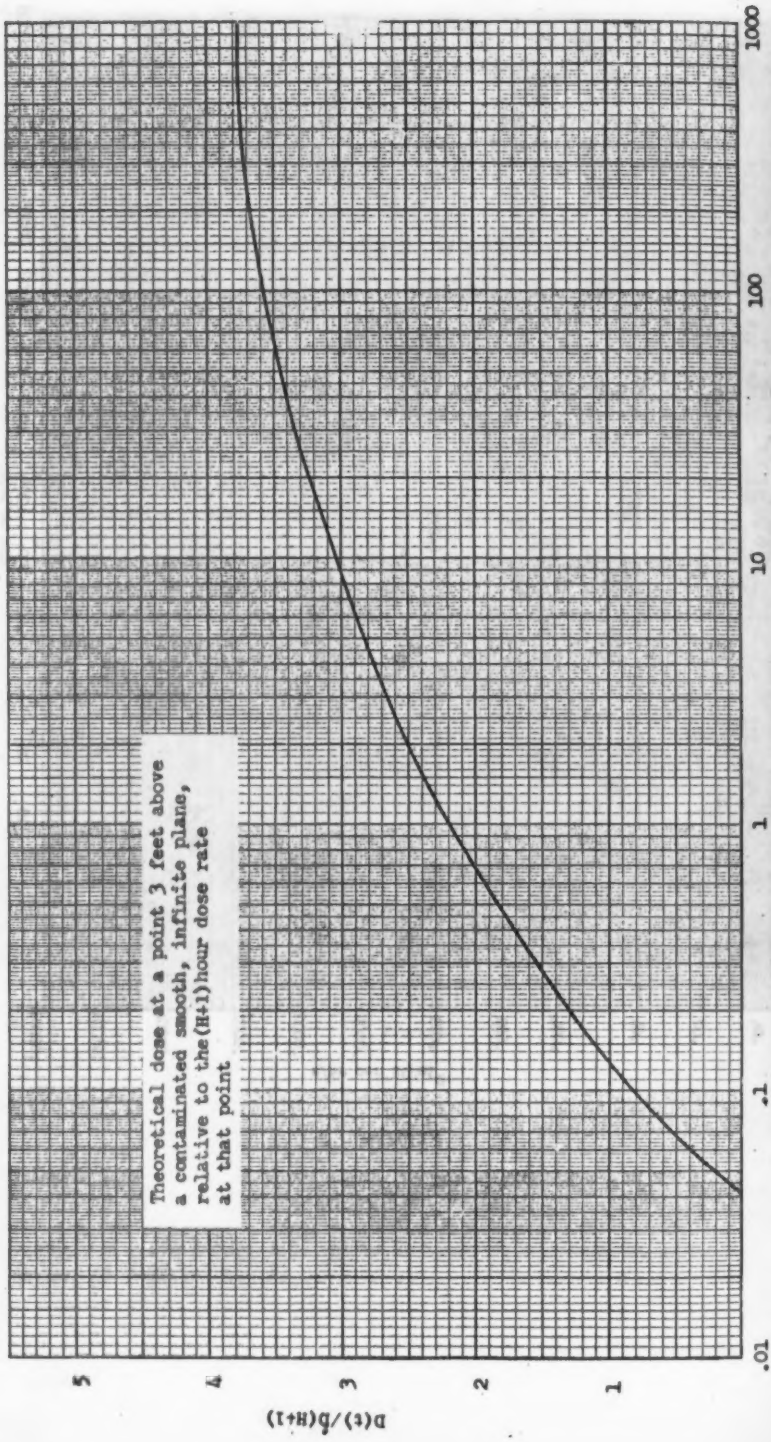
Theoretical dose at a point 3 feet above a contaminated smooth, infinite plane, relative to the (H+1) hour dose rate at that point
D(t)/D(H+1)
5
4
3
2
1
.01
.1
1
10
100
1000
TIME IN DAYS

Figure 4

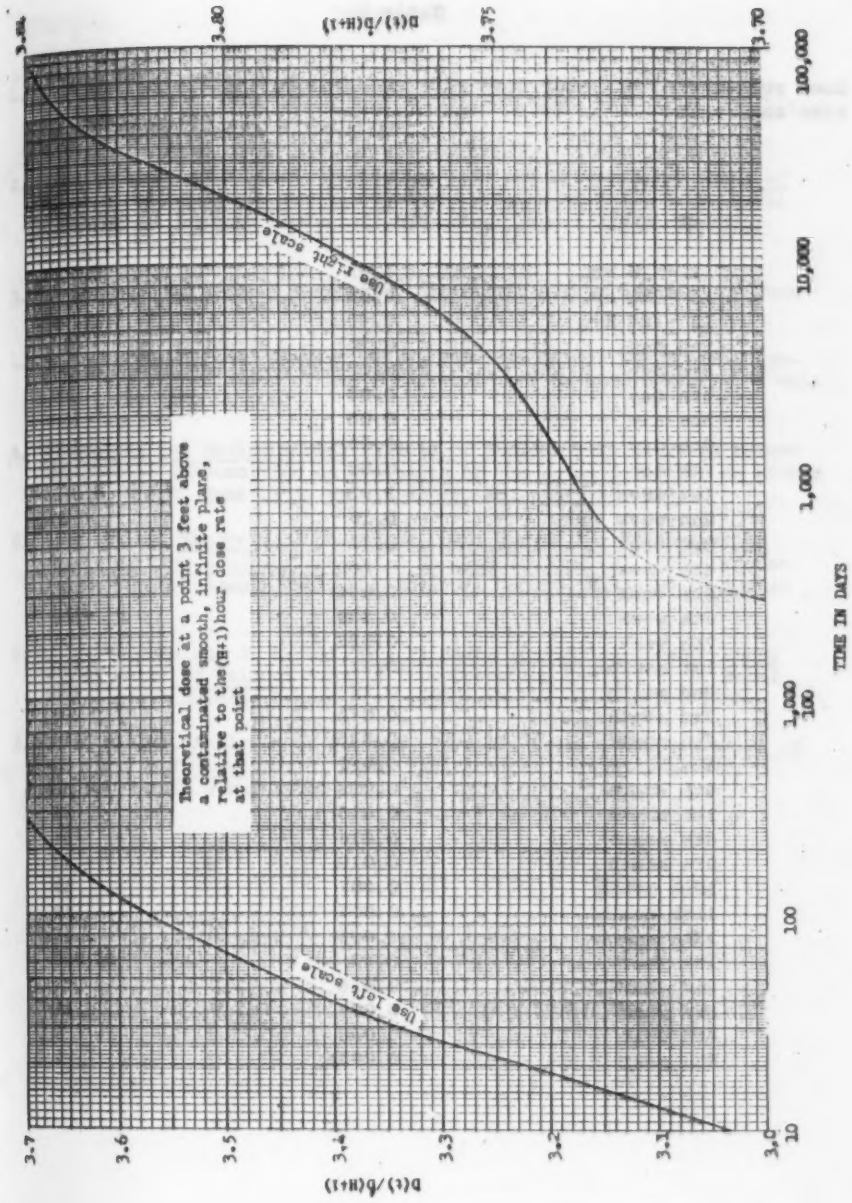
Theoretical dose at a point 3 feet above a contaminated smooth, infinite plane, relative to the (H+1) hour dose rate at that point
Use left scale
Use right scale
D(t)/D(H+1)
TIME IN DAYS
3.7
3.6
3.5
3.4
3.3
3.2
3.1
3.0
3.80
3.75
3.70
20
100
1,000
10,000
100,000

Figure 5

Table I

Dose relative to H+1 hour dose rate received during the following time intervals:

Δt	$\frac{D(\Delta t)}{\dot{D}(H+1)}$, r r/hr	$\frac{D(\Delta t)}{Kt/mi^2}$, r
1 - 6 hr.	1.42	3,905
6 - 12 hr.	0.38	1,045
12 - 24 hr.	0.40	1,100
2nd day	0.30	825
3rd day	0.10	275
4th day	0.08	220
5th day	0.05	138
6th day	0.05	138
7th day	0.05	138
1st week	2.93	8,060
2nd week	0.19	523
3rd week	0.11	311
4th week	0.089	245
5th week	0.054	149
6th week	0.039	107
7th week	0.033	91
1st month	3.31	9,100
2nd month	0.17	468
3rd month	0.075	206
4th month	0.045	124
5th month	0.031	85
6th month	0.025	69
7th month	0.015	41
8th month	0.015	41
9th month	0.012	33
10th month	0.007	19
11th month	0.007	19
12th month	0.005	14
1st year	3.72	10,230
2nd year	0.016	44
3rd year	0.004	11
4th year	0.003	8.3
5th year	0.0025	6.9

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2. C. F. Miller and P. Lock, Ionization Rate and Photon Pulse Decay of Fission Products from the Slow-Neutron Fission of U^{235}, U. S. Naval Radiological Defense Laboratory, Technical Report USNRDL-TR-247, 4 August 1958.

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4. Fallout from Nuclear Weapons Tests, Hearings before the Special Subcommittee on Radiation of the Joint Committee on Atomic Energy, 3 vols., USGPO, May 1959, p 1969.

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7. W. H. Shipman and J. R. Lai, 4 - Pi Gamma Ionization Chamber Decay Measurements of Fallout Samples from Operation CASTLE, U. S. Naval Radiological Defense Laboratory, USNRDL-TR-147, 31 January 1956.

8. C. F. Miller, Analysis of Fallout, Part II, Decay Characteristics of Radioactive Fallout, U. S. Naval Radiological Defense Laboratory, USNRDL-TR-221, 9 May 1958.

Enclosure (3)

From Summary Statement of Findings Related to the
Testing Program at the Nevada Test Site by
K. H. Larson & Associates, page 2014, Vol. 3, 1959
JCAE Hearings on the Fallout from Nuclear Weapons Tests

"7. Decay of fallout radioactivity. Fallout materials from a specific shot had similar beta decay curves regardless of particle size and time of fallout. Beta decay curves of most shots approximate the $T^{-1.2}$ occurred from H 6,000 to H 6,000 hours. Slopes of the order of $T^{-1.2}$ occurred from H 6,000 to H 10,000 hours.

Decay curves of the gamma emission rate were different from those of beta decay for fallout materials from a specific shot. Gamma decay curves of fallout from different shots were generally similar, but more variable than corresponding beta decay curves. Plumbob beta and gamma decay curves are illustrated in figure 6 in relation to the $T^{-1.2}$ decay curve and a theoretical mixed fission product (U^{235}) decay curve.

Estimates of dosage in fallout areas have generally been based, in part, on a decline of dose rate (mr/hour) with time according to the $T^{-1.2}$ relationship. A dose rate decline with time according to the Plumbob gamma decay curve illustrated in figure 6 yields calculated doses which are 1.5 to 2 times greater than those calculated by the $T^{-1.2}$ relationship for different fallout times to approximately 400 days after shot (see below):

Comparison of dose to 10,000 hours calculated on the basis of Plumbob gamma decay curve and $T^{-1.2}$ relationship (100 mr/hour at time of arrival)

Time of Arrival	Plumbob dose to 10,000 hours	$T^{-1.2}$ dose to 10,000 hours	Plumbob dose/$T^{-1.2}$ dose
H + 2 hours	1,638 mr	818 mr	2.00
H + 4	2,635	1,582	1.67
H + 6	3,993	2,319	1.72
H + 8	4,979	3,041	1.64
H + 10	5,917	3,744	1.58
H + 12	6,679	4,437	1.51

X